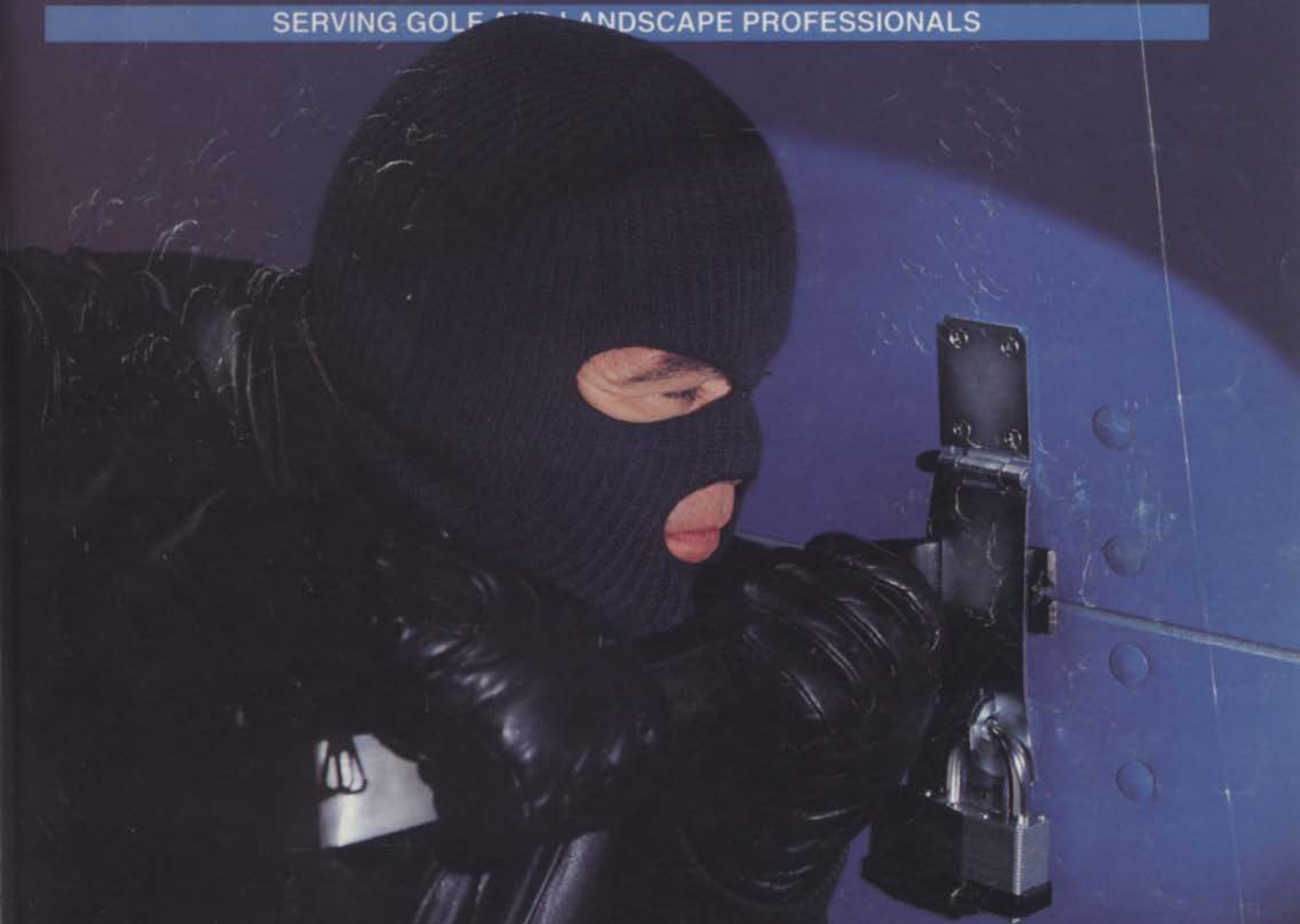


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Reflections in the desert

The desert sun reflected off the shiny sea of Mercedes, Jaguars, and BMWs with a vengeance, assaulting my tender eyes. "So this is Palm Springs," I thought, squinting, walking through The Springs Club's parking lot. (We weren't really in Palm Springs but Rancho Mirage, Calif., and that's close enough.)

My tour guide was Mel Robey, turfgrass instructor at the College of the Desert in nearby Palm Desert. In 1987, he'd offered to show me around "a few of the 75 golf courses in this area." It was nearly four years later, and there were now more than 80 courses, but I finally took him up on it.

Robey, former superintendent for Purdue University's 36 golf holes, had the perfect preface to our tour of the area: "People expect better maintained golf courses around here because of the money they pay and what they see on television."

What he didn't say is that many of the tournaments Palm Springians see on television are taking place in their own backyards—literally.

Robey maintains a close working relationship with many of the Coachella Valley's golf course superintendents, including Ross O'Fee, a transplanted New Zealander who's now at The Springs Club. O'Fee is also president of the Hi-Lo Desert GCSA and a born talker who began our conversation by agreeing with Robey.

"If members see changes happening on their course, they don't get bored," he said. "But one of the problems with being a superintendent around here is that you're constantly being compared to the other courses."

For that reason, superintendents in the Coachella Valley form a close fraternity, O'Fee notes. Similar demands are placed on them by their high-rolling members. This situation has led to lots of equipment-swapping among supers and other cooperative efforts.

O'Fee mows his bentgrass greens at $\frac{3}{64}$ th of an inch. That's right: bentgrass greens, here in the heart of the desert.

"The trend around here is away from bermudagrass greens," O'Fee notes. "Bentgrass is faster than bermuda, and that's what our golfers want."

While most other Californians are experiencing water bans resulting from a five-year drought, those nestled at the foot of the San Jacinto Mountains have their own little aquifer that will supposedly supply the area with water for hundreds of years to come. Hence the trend toward the higher water-use bentgrass.

Bentgrass vs. bermudagrass is a controversy we'll explore more fully in our August issue. But for now, wave with us—if you will—at Ross O'Fee and Mel Robey disappearing in the rear-view mirror as we high-tail it out of the lush Coachella Valley, through the desert, back toward La-la-land and the long flight home.

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Jerry Roche, editor

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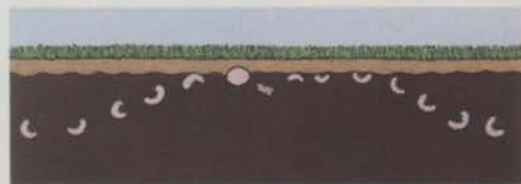


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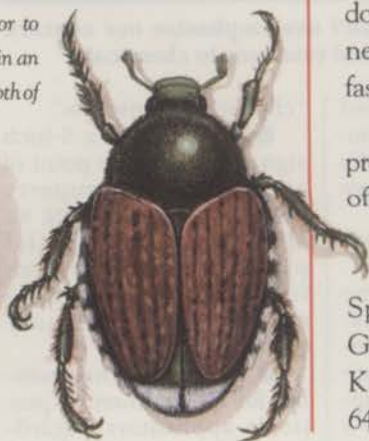
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LANDSCAPE MANAGEMENT

LEGISLATION

Green industry petitions for practical regulations

WASHINGTON, D.C.—Green industry representatives campaigned here on May 9 for lawn care product legislation that simply makes sense, during Senate hearings on pesticide use. And despite an emotional offensive from alleged victims of pesticide poisoning, industry spokespersons believe their voices were heard.

"I felt good about the approach the senators took," said Ann McClure, executive director of the Professional Lawn Care Association of America (PLCAA). "They were on a fact-finding mission. They are willing to take a look at the issue. There's no doubt that public citizens want to know if they're in danger. They deserve to know, but there's a broad spectrum of choices of ways to solve it."

It's not that PLCAA doesn't want notification standards, it just wants those standards to be practical.

McClure outlined for the subcommittee the notification and training programs it supports for both commercial and non-commercial users of lawn care products.

"PLCAA endorses the concept of reasonable and responsible national regulation of the lawn care services industry," said



PLCAA's McClure: "I can't overemphasize our concern when we hear stories about reactions to chemicals."

McClure, "and is pleased to share with this subcommittee an outline of the very positive program we support."

The PLCAA program includes standards for:

- Pre-notification, one day in advance, to customers who tell the applicator they wish to be notified; persons whose property abuts an applicator's customer's property who notify the applicator that they wish to be pre-notified; and persons whose names are registered as

"chemically sensitive."

- Posting a 4 x 5-inch sign at the primary point of access to the property immediately following an application. Residential properties of more than four families would be marked at all primary points of entry.

- Licensing and training for all commercial pesticide applicators, regardless of whether the pesticides applied are classified for general or restricted use.

"What we're disagreeing

on," said Sen. Joseph Lieberman (D-Conn.), "is the nature of the right-to-know."

"We do highly recommend to our members that they tell customers exactly what they are doing," replied McClure, when asked by Lieberman why the burden of seeking information is placed on the customer. "The question we're addressing now is, who else needs to know?"

"We think that other people who may suffer a reaction to the chemicals certainly ought to know also. It's got to be done in some practical way."

The Notification of Chemical Application Act of 1991 (S.B. 849), introduced by Lieberman and Harry Reid (D-Nev.) would require commercial applicators of lawn care and other non-agricultural chemicals to provide detailed written contracts to all customers. Others who may come in contact with lawn care products would also have to be notified. Notification would include persons within 1000 feet of the property, a draconian provision that would play havoc with company time and scheduling.

"When you get into broad contexts of the bill," said Warren Stickle, presi-

dent of the Chemical Producers and Distributors Association, "you would find you'd have to notify 25,000 people for one application of pesticides."

Stickler suggested the bill include a requirement for a registry list, much like the registry now used in seven states.

As an alternative to the 1000 feet provision, McClure recommended to Sen. Reid that the treated property be posted, adjacent residents be notified, and a registry of chemically sensitive persons be established.

McClure opposed the mandatory contract provision in the proposed bill on two grounds. One, customers don't want to be bound to a contract; and, two, because of the part nature plays in the business.

"We are dealing with something that is alive and changing," said McClure. "The weather is variable, and it's very difficult to say that every first week in June, we will apply something."

Senator John Warner (R-Va.) pursued the issue of homeowner qualifications, questioning McClure in detail about the training requirements for commercial applicators. He then asked whether homeowners are subjecting themselves to risk through misapplication.

"I happen to think the homeowner is subjected to risk, and has the potential to subject his neighbors to risk," responded Fred Hundt, vice president of marketing for the Ringer Corp., a maker of organic lawn care products.

"I would just offer that the only instruction the homeowner may receive is from what's on the bottle, assuming he or she reads it," said William Roberts, vice president of the Golf Course Superintendents Association.

"Beyond that, I'd wonder about time of application and rate of application. Do homeowners actually take the time to go out and calibrate equipment so

that it's applied properly?"

Said Stickler: "There are a number of companies spending millions of dollars to look at alternatives to pesticides. In the 1990s, we may very well see some of these products come on the market. In the long run they will provide an opportunity to those who want organic or biological control product to avail themselves of that kind of product. We will see a balance between the synthetic pesticides and the new bio-



Warren Stickler, left, president of the Chemical Producers and Distributors Association, and Mike Stevens, chief executive officer of Howard Johnsons Enterprises, presented information on the benefits of lawn care products when they are used safely.

logical control type products."

"Business is driven by the market," said McClure, who said some PLCAA members have been receiving more inquiries from customers interested in organic products.

The other side

Dr. Janette Sherman of Alexandria, Va., a specialist in internal medicine, said America was at risk of fostering an "impaired population: with respiratory problems, neurological problems, learning disabilities, kids who can't go to school."

"The widespread use of chemical means to prevent or to rid a building of insects is also suspect when the corporations pushing these chemicals are also those that benefit from their sales."

Sherman expressed great mistrust of chemical company research, which

she compared to "having Dracula guard the blood bank."

Thomas Latimer of Dallas testified he was poisoned and disabled by the interaction of the prescription drug Tagamet and diazinon insecticide he applied to his lawn.

"I do not want diazinon banned, nor do I want Tagamet removed from the market," said Latimer. "I am simply requesting that the corporations and government agencies work to

Hussein threatened to use during the Persian Gulf war. That prompted Warner to caution the group to go easy on the sensationalism.

"We have a duty not to unduly scare the public," cautioned Warner. "Alar was depicted as the killer of all children. And let's be very careful in our references to historical military use. There is a non-partisan bureaucracy struggling to get to the issue."

Balance and sense

Tom Delaney, PLCAA director of government affairs, said later that he thought the hearings went "fairly well," and that Senator Warner brought "some balance and common sense to what's going on. He interviewed each of the witnesses, and asked what kind of advice they would give to people using the products. Just about without exception, they said they want (users) to read and follow the labels," not totally eliminate the products.

"We're not against regulation," said Delaney. "We could work on every one of Lieberman's points, but not the way he wants them. We were very strong on the point that these are the same products homeowners are using. I think I got the point across."

Next item on the agenda is negotiations among industry representatives and the committee, to see if they can reach a compromise. "In its present form," said Delaney, "not even the senators were agreeing that it could work."

Sources inside industry say the Lieberman bill will not pass, thanks to intensive company lobbying, and the possibility that homeowners might themselves come under scrutiny. For any law to be fair and practical, homeowners who apply control products would have to obey notification and posting requirements as well, which might sour them from buying products altogether.

—Terry McIver □

No predictions on case being reviewed by the Supreme Court soon

WASHINGTON, D.C.—Green industry representatives who sat through oral arguments in the Supreme Court case of *Mortier v. Town of Casey* were unwilling, as *LANDSCAPE MANAGEMENT* magazine went to press, to make any predictions on the case's outcome.

Implications of the case will affect how professional pesticide applicators go about their business.

"We've had a hard time getting people in the industry to realize how significant this case is," says Steve Hardyman of ChemLawn. He and Tom Delaney of the Professional Lawn Care Association of America both attended the Supreme Court arguments here.

"The judged seemed

very interested in this case," says Delaney. "They were asking some common-sense questions and not high-tech legal stuff."

"The majority of us (who were there) think we'll win 5-4, just based on the questions asked by the judges."

The case hinges on the *Town of Casey* (Wisc.) claim that it can pass and enforce its own pesticide regulations. From 1981 through 1985, it enacted five separate pieces of pesticide regulation. Industry insists that pesticide use restrictions are a function of the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA).

"It's a wait-and-see situation until the decision comes out," says ChemLawn's Hardyman. □



Teddi Davis of The Garick Corp. (left), Bob Andrews of PLCAA and Tom Garber of ALCA.

ORGANIZATIONS

Green Expo set thru 1995

CLEVELAND — Representatives of three turf and landscape organizations met here May 14 to sign an agreement that guarantees the existence of the Green Industry Expo through the year 1995.

"It's been an ordeal, a rocky road, but it's been a rewarding experience," said Bob Andrews, who represented the Professional Lawn Care Association of America.

The agreement was needed largely to define the role each of the organizations will play in the

expo. Under its terms, the PLCAA will be the trade show manager through 1994; in 1995, a third party can be hired in its stead, if the organizations so decide.

Tom Garber represented the Associated Landscape Contractors of America (ALCA). "The industry as a whole can relax and count on this show through 1995 now," he said. "The show will develop a life of its own as 1995 approaches." Under the agreement, the PLCAA will receive 55.0%

continued on page 62

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NEWS BRIEFS

A GREEN YEAR?...Lesco chairman **Jim FitzGibbon** sees a good future continuing in the green industry, according to an article in the *Cleveland Plain Dealer*. He told the newspaper that Lesco should have a record year, with perhaps 20 new service centers opening up nationally. The service centers, which opened up five years ago, now account for almost 40% of the company's business.

EXHIBITING EXHIBIT...Exhibit insecticide is the first product to be marketed following an agreement between Ciba-Geigy and Biosys to market biological insecticides. It works on turf surface feeders, Ciba-Geigy says. "It was the most effective biological product we reviewed," notes product manager **Scott Moffitt**.

CLIPPING SAVINGS...Using a mulching mower to cut a typical half-acre lawn each summer can return nearly 5,500 pounds of grass clippings to the soil, and eliminate up to 465 bags of clippings as waste disposal, based on recent tests announced by Garden Way Inc. and the Rodale Research Center. Although **Dr. Terry Schettini** of Rodale says it's too early "to receive definitive data from soil core samples," he indicates that grass cut with mulching mowers has a healthy appearance with no clumps of grass or visible thatch buildup.

ON THE FUTURE...Forecasting International has been commissioned to conduct the first comprehensive research study on the future of the landscape industry. The research will forecast major consumer trends through the remainder of the 1990s and into the next century. Forecasting president **Dr. Marvin Cetron** is personally heading up a team of five research professionals.

THE NAME IS BOND...Bond—**James E. Bond**—has won a \$12,000 scholarship from the Musser International Turfgrass Foundation for his work at the University of Tennessee in Knoxville. Bond is a doctoral candidate working on developing techniques to transfer desirable traits from one plant to another.

IN SEARCH OF A TREE...The National Arboreal Emblem Bill is a long way from becoming law, but it holds high hopes for **Harry Banker** of the International Society of Arboriculture. Banker, who is chair of the ISA's National Tree Committee, is pushing the arboreal emblem bill, which would make the oak the national tree. At presstime, only 23 co-sponsors have lined up to support the bill, while 218 are required. □

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ATHLETIC TURF

Too much synthetic?

The Seattle, Wash., area has become a haven for synthetic turf manufacturers. According to a series of articles in the Seattle synthetic football fields at the high school level are booming there.

One article, written by P-I reporter Greg Brown, notes that the 14-team South Puget Sound League has just three teams still playing on real grass. The city of Bellevue has four high school synthetic fields, valued at \$2.8 million each. Twenty-five Washington high schools, most of them in the greater Seattle area, are now synthetic.

However, another article, also written by Brown, questions the safety of synthetic fields.

"In the debut of Bellevue High School's field Sept. 21 (1990), Mike Camlin was the fourth Redmond player sidelined in the first half in what Redmond Coach Jim Sampson calls the most injuries he's seen in a half in 12 seasons," Brown's article notes. The injuries were torn knee ligaments and cartilage (to Camlin), a bruised rib, a bruised shoulder and loss of breath. □

IPM

Florida County officially adopts IPM practices

GAINESVILLE, Fla. — Sarasota County officials say they have officially adopted integrated pest management practices to decrease pesticide use on all county government properties.

But is this anything more than a publicity stunt, a jumping on the IPM bandwagon just to keep the wolves away from the door?

Michael Holsinger, director of the County Extension Service at the University of Florida's Institute of Food Agricultural Sciences (IFAS), says IPM is "the wave of the future. Citizens want environmentally safe pest control, the cost of research and registration for new pesticides continues to climb and there's a lot less liability involved with integrated pest management than with pesticides that are toxic to humans and animals."

Holzinger describes IPM as a practice that uses as few chemicals as possible. "When chemicals are necessary," writes the IFAS, "the least toxic are used."

After six months of preparation, the IPM mandate was made effective on April 2, following a vote by county commissioners and an 11-member citizens' advisory committee on environmental pest management.

"There's been a lot of rhetoric written about IPM over the past few years," says Holzinger, who admits that many of those who promote IPM have conflicting definitions for the practice. "The guidelines are somewhat limited," admits Holzinger, "but the general guidelines say you don't destroy the beneficial predators, and you should try to use pest-

resistant plants."

The extension service news release describing the program uses the words "toxic" and "least toxic," when describing chemicals. But is toxicity an issue when chemicals are used correctly? Yes and no, says Holzinger. "Say you have a selection of 10 different materials," he explains. "You want to select the least toxic of those. There are degrees of differences. I would consider Orthene and Dursban a lot more toxic than insecticidal soaps or horticultural oils, and diazinon more toxic than Orthene and Dursban."

Bacillus thuringiensis (bt)—a biological control agent that has proved to be the most effective of the as-yet limited biological products—is part of the county plan, as are nematodes for mole cricket control.

Structural pest control is included in the county IPM plan. Precor and Gencor growth regulators are used against fleas and roaches.

Even though many professionals are prudent when it comes to chemical use, Holzinger says they face the scrutiny of suspicious customers when chemicals are not used.

"The average customers feel they need to have something applied to feel they are getting their money's worth," Holzinger realizes. "The biggest problem with the way IPM is presented is that it's difficult for people to see concrete steps they can take to implement an IPM program."

"We need to develop appreciation for the fact that we're not going to eradicate insects," he concludes. "We have to set thresholds before treatment." □

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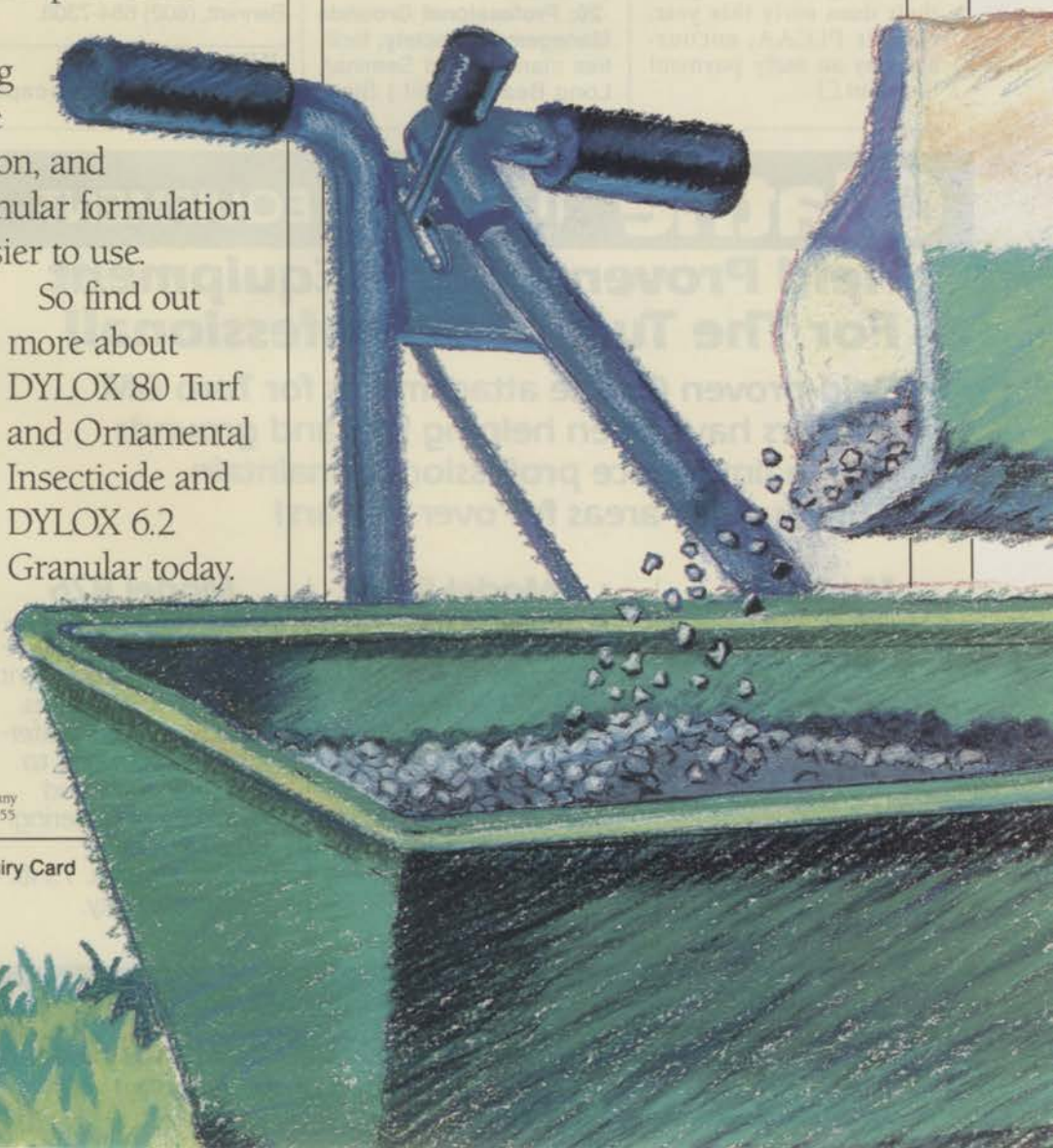


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New PLCAA dues structure a definite plus

MARIETTA, Ga.—The Professional Lawn Care Association of America (PLCAA) reports a two percent gain in new members, and believes its new rate structure will bring more into the fold.

"Response has been excellent," says Ann McClure, PLCAA's executive vice president.

"Many LCOs are responding favorably to the change in dues. The association hopes this means PLCAA will have far broader national representation."

PLCAA adjusted its dues to encourage more companies—large and small—to come aboard. More than 10 percent of renewing members paid their dues early this year, reports PLCAA, encouraged by an early payment discount. □

EVENTS

JUNE

12-16: AAN Annual Convention and Nursery Industry Exposition, Nashville, Tenn. Contact: AAN headquarters, 1250 I St. NW, Washington, DC 20005; (202) 789-2900.

17-20: "The Technical Arborist." San Francisco, Calif. Contact: The Arbor Day Institute, 100 Arbor Ave., Nebraska City, NE 68410; (402) 474-5655.

18-19: Jacklin Seed Company Discovery Tour, Post Falls, Idaho. Contact: Jacklin Seed Co, West 5300 Riverbend Ave., Post Falls, ID 83854; (208) 773-7581.

19-22: National Rails-to-Trails Conference, Baltimore, Md. Contact: National Office, 1400 16th St., NW, Washington, DC 20036; (202) 797-5400.

20: Professional Grounds Management Society, facilities management Seminar, Long Beach (Calif.) State

University. Contact: PGMS, 10402 Ridgland Rd., Suite 4, Cockeysville, Md 21030; (301) 667-1833.

20-21: "Media, Fertility and Water Quality Management" seminar. Contact: The Ball Institute, (708) 231-3600.

25-26: "Diagnosing, Managing and Complying with Regulations," applied to insect and disease control. Fee of \$500. Contact: The Ball Institute, (708) 231-3600.

26-27: Cornell University Field Day, Ithaca, N.Y. Contact: New York State Turfgrass Association, (800) 873-8873.

27: "A Look at California Irrigation: Water Management for the 1990s and Beyond," UCLA Riverside campus. Contact: Hartley Bennett, (602) 684-7308.

JULY

1: "Japanese Landscape

Architecture." Contact: UCLA Extension Service, (213) 825-9414.

10-12: Environmental Regulation Course, Atlanta, Ga. (Info on the Clean Air Act, Clean Water Act, Resource Conservation and Recovery Act, Superfund, Right-to-Know, OSHA.) Contact: (800) 831-8333.

11-13: CLCA Summer Tri-Board Meeting. Contact: Micheyl Barnett, California Landscape Contractors Assn., (916) 448-2522.

11-15: American Association of Nurserymen Annual Meeting, Orlando, Fla. Contact: AAN, 1250 I St., Washington, DC 20005.

13: Equipment Field Day, Brookville, Md. Contact: Mike O'Hare, Maryland Seeding Assn., (301) 249-2008; John Lanigan, (301) 795-5980.

14-16: Mid-Atlantic Nurserymen's Trade Show, Baltimore. Contact: P.O. Box 314, Perry Hall, MD 22128. □

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Model 82 Aerator/Seeder

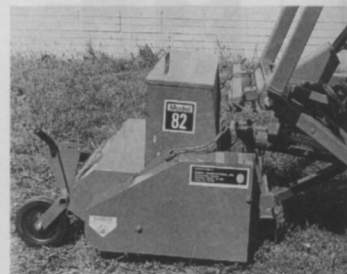
PTO-driven attachment to the GM 300 series tractor that aerifies, thatches and slit seeds at the same time. 30" swath on 3" centers with adjustable blade depth and seed flow.

Model 826 Polymer Planter

PTO-driven attachment to the GM 300 series tractor. It plants water-absorbing polymer to reduce amount and frequency of watering. 30" swath on 6" centers. Approx. 75 lb. hopper capacity.



Model 67



Model 82



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Crabgrass

Plus the broadleaves

Read how three turf professionals with totally different situations are using Trimec® Plus Herbicide to help them cope with nutsedge, grassy and broadleaf weeds in today's environmental age.



Everett Mealman, President
PBI/Gordon Corporation

If you think that controlling yellow nutsedge and goosegrass in turf is a tough assignment, you should have Tom Hilferty's challenge:

Hilferty is superintendent of the Tatum Ridge Golf Links in Sarasota, Florida and he has to control these pests with his hands tied behind his back. "At least that's the way it feels sometimes," laughs Hilferty.

Tatum Ridge is a semi-private course that also caters to affluent, discerning, fee-paying guests. The layout must be immaculate and the environmental constraints are monumental.

The course comprises 111 acres of bermuda turf, 30 acres of water, 54 acres of protected wetlands and is a refuge for wildlife and endangered species. Furthermore, it is only seven miles from the gulf shore, so excessive winds and high temperatures mean that there are very few days when suitable spraying conditions exist.

"Nutsedge and goosegrass and broadleaves love those protected wetlands," says Hilferty, "so we're going to have them

in our turf and, of course, that's unacceptable."

Hilferty goes on to say that he watches for that special day when the wind is down and the weeds are coming up, and it's then that he delivers his one and only wall-to-wall broadcast spray treatment of the year — a tank-mix of Trimec Plus and Ferromec® AC Liquid Sprayable Iron. "If you can only do it once, you better do it right the first time," insists Hilferty.

If any nutsedge or broadleaves ever show up after the broadcast — and they do show up — Hilferty goes after them with his trusty spot sprayer, loaded with Trimec Plus.

Does the program work? "Count the golfers and take an inventory of the wildlife," challenges Hilferty.

#1 for crabgrass control

If Trimec Plus is now the number one post-emerge for economical control of nutsedge and goosegrass, it is also number one for crabgrass. Just ask Paul Branon, who owns two Lawn Doctor franchises in the Acton, Mass. area, an upscale suburb of Boston.

"Crabgrass used to be our number one problem in bluegrass," says Branon, "but since we discovered Trimec Plus several years ago, crabgrass has become our favorite grassy weed. Our ability to control it and to guarantee a crabgrass-free lawn has been a factor in our growth."

Branon's customer base consists primarily of affluent, environmentally-aware homeowners who want immacu-

late lawns — no crabgrass, and a minimum usage of chemical.

"Our goal is to create turf that is so thick and healthy there is little room for weeds to germinate or disease to get established," says Branon. "Consequently, we want to treat those lawns at least five times a year to properly space out the feeding and monitor for disease. We also need the revenue from five treatments to generate enough cash flow to maintain our level of service."

Branon goes on to say that before he discovered Trimec Plus several years ago, he was limited in the number of customers he could serve because his first treatment consisted of fertilizer, Trimec Classic, and a pre-emerge herbicide. Consequently, it was confined to the window after the broadleaves start to grow and before the crabgrass germinates.

So if the crabgrass germinated before we finished our first round," says Branon, "we simply lost the treatment because we had never found a post-emerge for crabgrass that was economical enough and sufficiently reliable to justify our no-crabgrass guarantee. Today, if the crabgrass is there before we complete our first round, we simply change the post-emergent herbicide to Trimec Plus. With one gallon covering an entire acre, the price is right."

How well does the Trimec Plus post-emerge control of crabgrass work? There is no room in Branon's office for any more Performance Evaluation trophies from Lawn Doctor, and these trophies not only reflect the quality of his work, but also the profitability of his franchise.

Ideal spot treatment

When you read about the experiences of turf professionals like Tom Hilferty and Paul Branon, don't you have an urgent desire to give Trimec Plus a trial? Obviously, most of your peers do, because Trimec Plus is surely the most exciting and fastest-growing herbicide to enter the field in many years.



Tom Hilferty, Supt. of Tatum Ridge Golf Links in Sarasota, Florida has extreme environmental problems and is restricted to one broadcast post-emerge spray per year to get goosegrass, nutsedge and broadleaves. Trimec Plus has proven to be the answer.

post-emerge control

& Nutsedge

in ornamental turf



Jim Deiman of Metro Airports Commission, Minneapolis-St. Paul, bought a jug of Trimec Plus last year so he could order an SP1E back pack sprayer for only \$49.95. Today he insists that the back pack sprayer loaded with Trimec Plus is the ideal combination for spot-spraying crabgrass, nutsedge and broadleaf weeds.



Paul Branon, a Lawn Doctor franchisee in Acton, Mass., used to lose business when crabgrass germinated before he was able to put down his pre-emerge. Today, he couldn't care less when crabgrass germinates because now he knows he can get it economically and dependably with post-emerge Trimec Plus.

"You can count me as one of those who wanted to test Trimec Plus," says Jim Deiman. "But I'll admit my yen for a back pack sprayer was every bit as urgent as my curiosity about Trimec Plus."

Deiman is in field maintenance for the Metro Airports Commission (MAC), based at Minneapolis-St. Paul International Airport. The MAC is not only responsible for the restricted 3,200 acres in Minneapolis, but also the six reliever airports in the seven-county metro area.

The landscape maintenance in the highly visible non-restricted areas which comprise the public entryways to the airports is handled by subcontractors appointed by MAC.

"We've been using a broadcast of Classic Trimec in our low-visibility restricted areas for a number of years," says Deiman, "but we've never been especially interested in Trimec Plus because we're not too concerned about crabgrass in low-visibility turf."

"But my home lawn is different," continues Deiman. "Crabgrass is a major problem for me."

Needless to say, Jim Deiman is one of the thousands of landscapers who has bought a jug of Trimec Plus and sent in for a back pack sprayer. So what does Deiman have to say about it now?

"We are very definitely going to recommend Trimec Plus and the back pack sprayer to our subcontractors who maintain the highly-visible turf in front of our airports," says Deiman. "Nothing makes as much sense in this environmental age as spot-spraying ornamental turf with Trimec Plus."

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HERBICIDE

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WHEN A BURGLAR STRIKES

If your company is burglarized, here are things you can do to guarantee a thorough investigation and increase the odds the thief will be caught.

by Steven Scarborough

Most company owners would prefer not to think about it, but thousands of businesses are burglarized every day. It happens about once every 49 minutes in the U.S., accounting for more than \$4 billion worth of property losses each year.

If your business is robbed or vandalized, you can help the police and your business by taking an active part in the investigation.

Many police departments, especially those in metropolitan areas, are overworked, and have little time for crimes like break-ins and

vandalism. They will visit the scene and try to find the culprits as well as your missing property, but they don't always have the manpower or resources to follow-up on every crime, no matter how important it seems to you. Here are some suggestions from veteran police investigators from around the country on how you can help.

1. Don't be a hero

Never make an attempt to confront a thief, either during or after the crime. If you are working late or arrive early to discover your business

has been broken into, do not enter the building; the thief may still be hard at work. Leave your building immediately and go to a nearby phone to call the police.

"Few burglars actually carry weapons," says retired Burbank, Calif. policeman Joseph Dahlia, now a chief of security. "But you don't want to corner the one that does. Commercial burglars are more often armed than residential burglars."

2. Secure the scene

Make sure every area that has been disturbed is preserved and remains untouched by employees.

It's natural to want to prepare for the business day and have the cleaning crew tidy up, but don't. "It may be embarrassing to leave products or papers strewn about the business," says Henry Truszkowski, Las Vegas Metro Police identification specialist, "but touching them could destroy evidence."

Don't clean up broken glass. Glass from a window or door that is broken to gain entry is a good surface for fingerprints.

3. Call at once

Notify the police as soon as the break-in is discovered. "The best time to catch criminals is within 48 hours of the crime," says Dahlia. While you are waiting for the police to arrive, start listing missing items. List especially those missing items you think can be easily pawned. Open drawers or move items with a long screwdriver or thin object to avoid obliterating fingerprints. Don't use a handkerchief to touch things. You won't leave fingerprints but you may damage fresh prints on a surface.

Give a copy of the list to the responding police officer, and ask for a supplemental report form, which you can use to add items you might discover missing later.

4. Record serial numbers

Give police the serial numbers of missing items, whenever possible. The FBI keeps a record of stolen items in its National Crime Information Network, which is accessible to all law enforcement agencies. The police can add your items such as tools, machinery or office equipment to the database and see if it turns up later among recovered items.

According to New York FBI agent Arthur Vallejo, entries can only be made with a serial number. "The faster the NCIC record is made, the better your chance of retrieving stolen

The silent warning

A monitored security system with silent alarm can ensure that a break-in will be detected and reported while in progress.

"We will slow (thieves) down, we will detect their presence, and we will respond accordingly," says Connie Pederi, sales and marketing manager for Gillmore Security Systems, Cleveland, Ohio.

Gillmore has been listening in on—and notifying police of—break-ins for 20 years. Its trademark blue-and-white signs, conspicuously placed in yards or windows, serve as fair warning to would-be Pink Panthers: "if you break in, we'll be listening."

When activated, a Gillmore system will report a break-in or fire to the company's control center. The control center operator then notifies local authorities.

A special zoning feature identifies which entrance has



Connie Pederi

been forced. The alarm also sends a silent emergency signal if it is somehow disarmed.

The alarm also reports any malfunction of sensors, wiring, power loss or low battery.

Pederi says installation of a security system can take two or three days, depending on customer needs and the size and construction of the building.

—Terry McIver

goods," says Vallejo.

5. Call in forensics

Insist on a fingerprint technician. The responding officer is there to get the facts; he's not a fingerprint or forensic expert. He may even decide that you have no items to process for fingerprints. But it's yours and your company's property, and you can request an expert to decide if fingerprints can be found.



HOW BURGLAR-PROOF IS YOUR PLACE OF BUSINESS?

		(CHECK ONE)		SCORE FOR "YES" ANSWER
		Yes	No	
1	Do you always lock all exterior doors at closing time?	☐	☐	15 points
2	Are your windows protected by well-anchored bars or grilles, and are all miscellaneous entries such as skylights, sidewalk openings, cellar entrances, and transoms locked securely when not in use?	☐	☐	15 points
3	Is the interior of your place of business adequately lighted during the night after closing?	☐	☐	15 points
4	Is your safe visible from the street through your front window?	☐	☐	15 points
5	Do you have Yale pin-tumbler locks with deadlocking features on all exterior doors and do you have double cylinder pin tumbler locks on all doors with large panes of glass?	☐	☐	15 points
6	Have you a good burglar alarm system, and is it inspected regularly?	☐	☐	10 points
7	Do you always leave your cash register unlocked with drawer open after closing time?	☐	☐	5 points
8	If you use a night watchman, have you had him carefully investigated and is he thorough in his duties?	☐	☐	5 points
9	Do you keep up-to-date lists of serial numbers of valuable merchandise?	☐	☐	5 points
My Business Protection Score Is:				100 points*

* A score of 90 or better indicates you are doing a good job of foiling burglars; a score of 85 means that you are doing a fair job; a score of 80 or less means that your place of business may become a burglar's delight.

Go around the area, noticing exactly what was touched by the burglar and where he may have gained entry. This will help to show the fingerprinting specialist exactly where to process for fingerprints. "A crime victim really helps when they know exactly where the burglar has gone within the business," says Truszkowski.

After your initial examination, be prepared to show the technician exactly what was touched and where

the burglar has gone within the business. Occasionally, a burglar is caught by leaving his fingerprints in unusual places, such as in the washroom or on the coffeemaker.

6. Ask your neighbors

Burglars often hit one to five businesses at a time, so the intruder probably tried to enter other businesses in your area.

"There are so many burglaries

A simple way to thwart drive-by theft

Theft can also occur on the road, when the distractions of the job take crews' attention away from the truck.

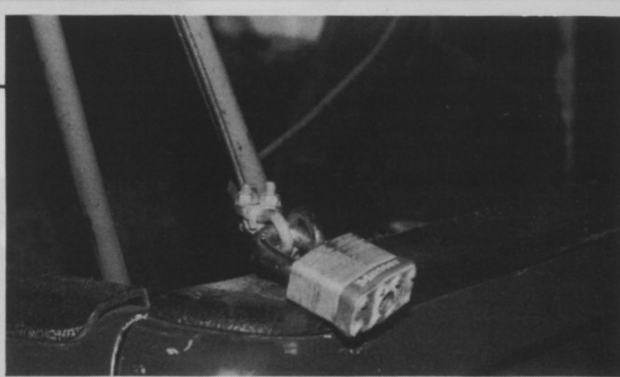
Herrick Mann's company, H.A.M. Landscaping in Warrensville Heights, Ohio, has been hit in the past by drive-by thieves, who have gotten away with string trimmers.

To thwart such robberies, one of Mann's men rigged up a simple but effective cable and lock contraption. The cable runs through the handle of each piece of equipment in the truck bed, and is locked to the truck body.

At the home base, Mann has installed motion detectors and other theft prevention/detection devices.

Smaller—but expensive—equipment, such as aerators or seeders, are locked in a separate cage.

In addition to serial numbers, Mann engraves each



Lock and cable device foils theft.

piece of equipment with his Social Security number. This leads to immediate identification by authorities.

"It resulted in a call at 2 a.m.," says Mann, "but it was worth it."

According to Mann, if authorities suspect an item is hot, they can easily call the social security number up on the computer; the number leads them to the owner. □

each day our detectives do not have the time they would like to devote to each one," says Truszkowski.

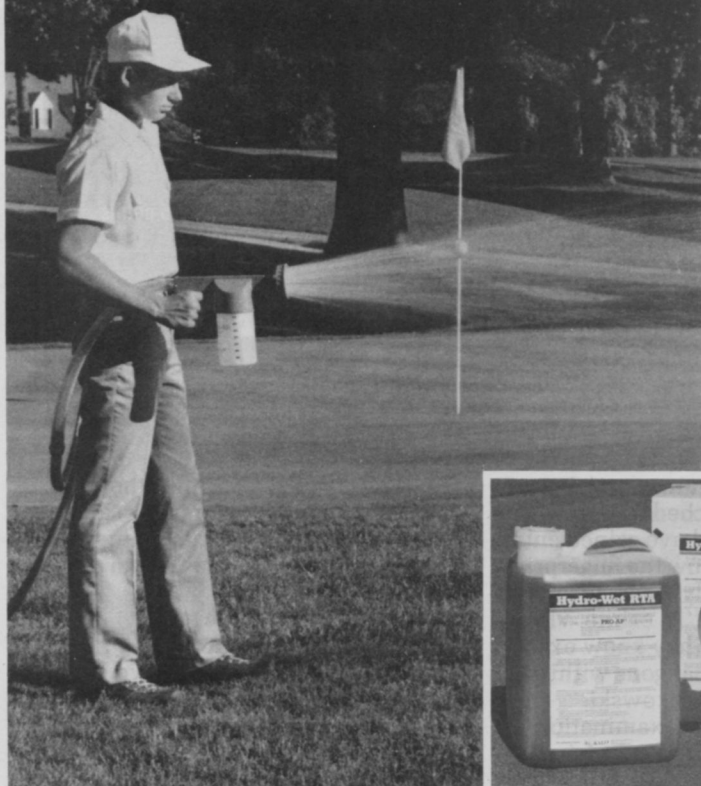
Someone might have seen an unfamiliar car or van and recall the license plate number; or a bystander may provide a description of a suspicious-looking character. You can't automatically count on people to come forward and get involved. If you learn anything that can be of help, talk to the police and let them decide if it's worth pursuing.

Keep in contact with the detective assigned to your case. If he knows you are actively interested in his progress, he'll probably be interested in it, as well. Although no civilian should play detective, you can also keep an eye open for your property at local swap meets and pawnshops. Burglars don't want your property; they're after money, and will quickly sell the items they steal for cash. Persons who pawn items must sign an information

card. If you do learn the name of a suspect in your burglary, immediately contact the detective and have him check out what you have found.

As difficult as it may seem, if your business is ever burglarized, try the positive approach. By taking an active role, you may recover some peace of mind if not your business's stolen property. The best attitude you can take is, "let's do what we can to catch this criminal." **LM**

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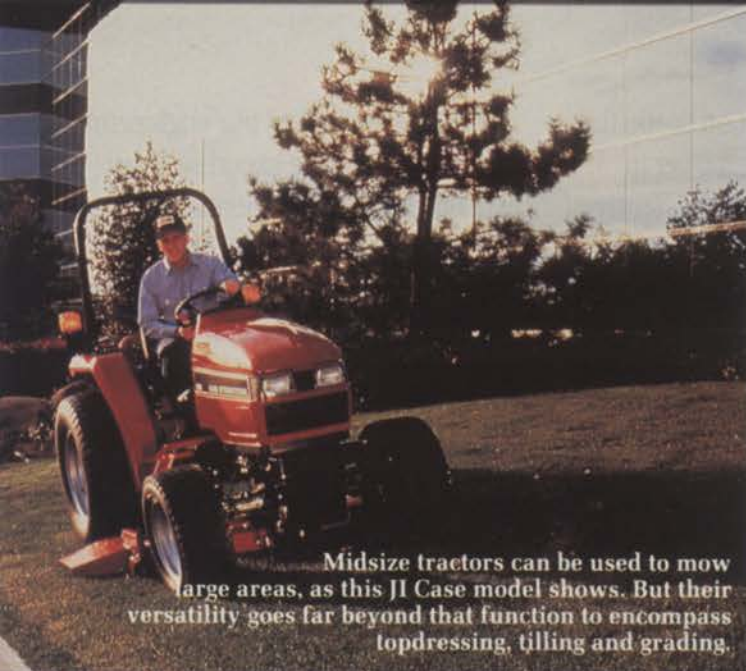


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Smooth operating hydrostatic drive mowers with cutting swaths from 36" to 61".



Division of Hesston Corporation



Midsize tractors can be used to mow large areas, as this 11 Case model shows. But their versatility goes far beyond that function to encompass topdressing, tilling and grading.

MIDSIZE TRACTORS HERE TO STAY

Though not an answer to every landscaper's every need, midsize tractors have a versatility that makes them valuable in many situations.

by Jack Simonds, contributing editor

Midsize tractors have come into common use with landscapers and other green industry professionals in the last three to four years—not replacing their heftier counterparts, but augmenting other motor pool vehicles.

Midsize utility tractors (about 20 to 40 hp) are seen industry-wide as useful tools in the fleet; as money-savers which share a spot in the workload because of their versatility, which often includes a good selection of attachments requiring hydraulics.

Simply, midsize tractors are here to stay. They have relatively low sticker prices, longer service life, lessened maintenance costs and sustained and strong resale and trade-in value. Industry watchers and practitioners seem also to zero in on their wide range of workload capabilities.

With hydraulic attachments and implements, these performers can often replace single-purpose machines in some settings, but also are not the panacea for every situation.

Carter Winn of Winn Nursery of Virginia, Inc., Norfolk, sees the midsize Ford and Kubota lines as good combinations in his 80-man operation; in part for one easy-to-understand reason.

"The units simply fit better between the rows at the nursery while cultivating," he says.

Winn explains that his original intent in bringing in a midsize line was for top-dressing, tilling and grading in the landscaping portion of his operations; an idea he says works well.

"In many cases, I need something small and sturdy," says Winn.

But the almighty dollar also played a practical role in Winn's original decision to downsize.

At one time, Winn Nursery's buying budget simply didn't allow for the purchase of larger tractors, although he says both have a place in his opera-

tions, and Ford's larger line complements his midsize vehicles.

"For loading and other bigger jobs, you really do need a bigger tractor," says Winn. He finds attachments for the middle line are no more superior than offerings for larger tractors.

However, he recently traded in two midsize tractors to add a larger one to the fleet. The smaller models, he says, spent an inordinate amount of time in the shop when used heavily.

Dave Davies, superintendent at Dry Creek Golf Course in Galt, Calif., uses four midsize tractors—including John Deere models—daily on the tees, approaches and other open areas, as well as in tight spots.

"The midsize lines are easy on maintenance. They're easy to operate overall and they're dependable," says Davies.

He commonly uses a spreader, drill seeder, fairway blower and sweeper, and tree auger as attachments to his midsize tractors.

Davies likes the maneuverability inherent in the line. His motor pool also includes Ford models and a larger Case frontloader.

Easy maneuvering can and does lead to good productivity for his eight full-time staff, Davies has found.

"We enjoy a much greater efficiency when using midsize tractors. This is particularly true when we use our applicator attachments. It seems the crew does not spend as much time in and around things setting up, but more time on the actual tasks at hand," Davies says.

But smaller units aren't the total answer for his little corner of the world.

"Smaller units are sometimes just not capable of doing some of the things you want to do. Some tractors are too small, some are too big. It just depends on the kind of job you're undertaking," says Davies.

Mixing breeds also works well for

Bob Dickison, superintendent at the 27-hole Upper Montclair Country Club in Clifton, N.J.

His Jacobsen 42 hp model gives mowing in the rough throughout the season and leaf blowing clean-up in the fall.

"Cost was not a factor for me. I feel the size (of the Jacobsen) is adequate do the jobs required of it," says Dickison, who also has larger tractors in the fleet.

Sometimes, says Dickison, bigger tractors simply need not apply. "There can actually be too much power in the bigger lines," he adds.

Tim Thilo doesn't know of such problems.

"I've never worked with a bigger tractor, but I assume the operating costs would be more," says the superintendent of Peach Tree Country Club in Marysville, Calif.

Four midsize John Deere models are used to groom the 35-acre, 18-hole course located in the north central section of the state. He says the course is "greening up nicely."

Also happy with midsize maneuverability and flexibility of job functions, Thilo says daily use may also lessen the chances of compaction forming under the surface of roughs and fairways because of the vehicles' relative light weight.

Although one 20-year-old model spends some time in repair, the new John Deeres, he says, have proven little trouble in maintenance and are adept in carrying out fairway mowing, clearing tasks and other daily chores.

Landscaper and nurseryman Mark Ball, with Stonegate Nursery Center in Algonquin, Ill., has more than a dozen midsize tractors in his operations—all of them Fords.

"Small tractors don't always get the job done and the larger ones don't have the maneuverability on residential lots," says Ball. He has used Fords exclusively since the mid 1960s. **LM**

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John Deere's 855 compact utility tractor.



Cushman's Front Line series with grass caddy.



From Ford New Holland, the Model 1220.



Case 1100 Series engines from 19 to 27.

Mid-size roster: ready to ride

Many players vie for a job in the starting lineup, so tractor manufacturers—veterans and rookies—are eager to supply the talent. From established hitters like JI Case, John Deere, Ford, Jacobsen and Kubota to Honda, the newest walk-on, comes no shortage of midsize tractors on the market.

Reasons vary for selecting one make or model over another, ranging from budget, reliability, product loyalty, ease of operation and operating cost concerns to attachment and servicing availability and performance.

Although not a complete list, here are some of the utility player choices for managers large and small.

JI Case introduces a new line of smaller tractors in its 1100 Series; machines equipped with 19-, 23- and 27-hp diesel engines. The tractors are designed with golf course, estate, park and farm settings in mind.

The three-cylinder engines feature direct fuel injection and a choice of mower sizes and arrangements are available. Also optional is an auxiliary hydraulic valve.

Front end loaders are available in the larger two models and backhoes; rotary tillers and

box scrapers are other options for the line.

Case's 95 Series ranges in models from 35 to 85 PTO hp and eight-speed creeper transmission. The company's Model 275 sports a 31 hp engine.

Circle No. 306 on Inquiry Card

Cushman's Front Line series offers both gas and diesel powered machines with a selection of mowers and maintenance tools to perform a variety of tasks. Power plants range from 22 and 27 hp gas models and 22 hp diesels, with both three and four-wheel drive options.

Mowing options include 60- and 72-inch front-mounted decks and a 61-inch flail mower. A 16-bushel grass caddy is also optional.

Among other attachments are a core destroyer, used after aeration which pulverizes cores. Cushman says the device covers 115,000 square feet per hour. Also available: a front-mounted 60-inch brush, snowblower and snow blade, tine rake dethatcher and front-mounted blower.

Circle No. 307 on Inquiry Card

John Deere offers two lines including midsize tractors for both grounds care and golf and turf settings. Three hydrostatic compact tractors equipped with

20 to 30 hp engines include the 755, 855 and 955 models. Five compact utility tractor models from 670 to 1070 are driven by 18.5 to 38.5 hp power plants. Two lawn and garden class tractors—the 400 and 300 series—come with 20, 18 and 16 hp engines.

All are diesel powered, and a wide array of "category one" attachments are available, including mowers, collection systems, aerators, loaders, snow blowers and throwers, backhoes, tillers, posthole diggers, front and rear blades, thatchers, dumpcarts, cultivators and other daily use options, offerings common among other manufacturers as well.

Circle No. 308 on Inquiry Card

Ford New Holland offers seven midsizers ranging in power from 14.7 to 42.6 hp and optional hydrostatic transmission on the four smaller models. Creeper gear in the larger tractors gives eight workings speeds less than 1 mph.

The all-diesel line also has different mower and landscaping optional attachments including mower configurations, many standard implements as well as disc harrows, cultivators, box scrapers, landscape rakes, windrow inverters

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J-6-8

Circle No. 111 on Reader Inquiry Card



Gravely midsizers come with many attachments.



Honda's H6522 diesel tractor enters the market.



Kubota's L4350 pulls a rotor cutter.



Ransomes markets the Turftrak system.



Jacobens's G-20D utility turf tractor.

and hay and rake tedders.

Circle No. 309 on Inquiry Card

Gravely's established smaller line varies from lower-powered 14 hp up to 24 hp models with Kohler-equipped engines. The 24 hp model is powered by an Onan engine.

More than 20 attachments are available and a mower surface cut of 100 inches is possible when the company's 44 inch wing mower works in tandem with the 60-inch center attachment. Snow blower, snow blade and power brush attachments, for parking lot maintenance are readily available as are three styles of grass catchers and four sizes of center mount mowers.

Circle No. 310 on Inquiry Card

Honda introduced the H6522 diesel tractor last year and full-scale marketing and sales are expected this season.

The 22 hp diesel accepts "category one" implements including a front-end loader, backhoe, snowthrower, dozer blades among other options.

The company says its three-cylinder, liquid-cooled power plant has a direct fuel injection system which saves fuel. Nine forward and three reverse speeds make up the transmission. Two- and four-wheel-drive versions are available.

Circle No. 311 on Inquiry Card

From Jacobsen comes both a traditional midsizer and a choice that defies the "looks-like-a-duck, walks-like-a-duck" rule.

The company's 45 hp G-20D diesel utility tractor has eight speeds and a three-point hitch. Creeper gear is also available on this lighter vehicle.

A double-take may be required for the company's G-4x4 Plus four-wheel drive utility tractor which features a low center of gravity and wide stance for stability. Beyond standard front-mount mower, brush and snow equipment, the G-4x4 Plus has front and rear three-point hitches and accepts an array of "category one" attachments. The power plant is a 32 hp Kubota diesel. Four reverse gears also are built in.

Circle No. 312 on Inquiry Card

Kubota offers wide choices in its B-Series and L-Series tractor lines and accessories.

New from the company are L-Series models L4350, L4850 and L5450 with power plants from 38 to 49 hp. The three diesels were introduced late last year.

Designed specifically for light construction, grounds maintenance and nursery and agricultural settings, the models

feature a wet clutch system Kubota says is designed for long life. Hydraulic transmissions are on all three models with a mechanical shuttle transmission option for the L4350. The complete Kubota tractor catalogue ranges in models from 10 to 85 hp.

Circle No. 313 on Inquiry Card

Ransomes offers its Turftrak System in three engine options including 16.5 hp Kubota diesel, 20 hp Onan gasoline and 21 hp Kubota gasoline engines. The line will be available at dealerships soon.

Among attachments are included a rotary broom, power blower, lawn sweeper, snow-blower, dozer blades, sand trap blade, aerator, slip scoop and disc edger.

Mowing options including three hydraulically driven front and rear rollers and rotary mower decks in 60- and 72-inch widths.

Ransomes Jaguar 4000 mower series offers six models ranging in 17 hp to 27 hp selections. The 24 hp and 27 hp models are gas-powered; the 17 hp and 23 hp feature diesel power plants.

Circle No. 314 on Inquiry Card

—Jack Simonds □

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Circle No. 122 on Reader Inquiry Card

THE PRICE OF LABOR

If you think your employees are making \$8 an hour, you're wrong. They're probably pulling down more like \$13 an hour, including downtime and benefits!

by Ed Wandtke, CPA

In the past five years, pay rates for labor in the industry have increased at an annual rate of 8 to 10 percent. These increases are the result of two trends.

First, there are fewer quality employees available on the job market. Secondly, production efficiency of individuals has increased, once they are hired and trained.

Many companies are now seeing pressure on their profit margins due to pay rates becoming so high that customers might not be willing to pay the billing rate. This column will discuss the true benefits cost for an employee, and how to calculate it for your company. This

will give you a basis upon which to set your billing rate at a profitable level.

Rate of pay

When rendering services at an hourly rate, most green industry companies find it hard to determine what a profitable billing should be. Service companies are also concerned with justifying to the customer the billing rate.

To determine the effective cost of an employee, you need to answer some basic questions about the amount of the costs you are experiencing for various tax, insurance, and other benefits.

Whether an individual is paid hourly, weekly, monthly or as a percent of production, you eventually will need to know the effective rate of pay the individual is earning. The effective rate (ER) is the total wages paid an individual for a 13- or 26-week period, divided by the total hours worked during the same period.

Other paid time

One area most often overlooked by a company in determining the true cost of an employee is the number of hours during which the employee is paid but doesn't really perform any work. Break time each day, paid lunch period, holiday pay, sick day pay, and other time-off programs are some examples of compensated time when the individual is not really working.

For most companies, the unworked time per year breaks down into the following table:

Break time (30 min./day, 200 days)	100 hrs.
Paid lunch (45 min./day, 200 days)	150 hrs.
Holiday (6 days/year)	.48 hrs.
Sick pay (5 days/year)	.40 hours
Left early or arrived late	.8 hrs.
Training (8 days)	.64 hrs.
Drive time (1 hr./day, 200 days)	.200 hrs.
Total unworked	.610 hrs.

Benefit costs

Most states require certain insurance or worker's compensation on all employees whether they are full-time or part-time.

Keeping these costs down is generally out of your hands as the owner of a lawn or landscape company. Knowing the effective rate of these costs for each employee will help cover them when you bill the individual employee's time.

Voluntary benefits

Voluntary benefit costs are life insurance, health coverage, dental, eye-ware coverage, disability insurance, life insurance, retirement, etc.

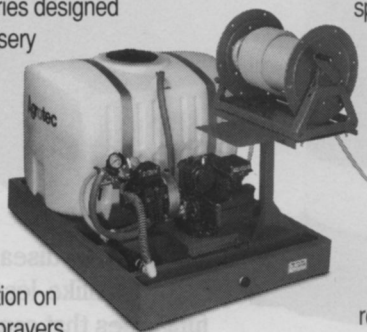
Some of these costs have been increasing at such a fast rate that many companies ask the employee to pay a percentage. Other companies are lim-

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iting eligibility until an employee has been working at a company for a longer period of time.

Statutory benefits

Statutory benefits are payroll-related costs set by the federal, state and local governments.

The most common of these expenses are FICA worker's compensation, disability insurance, unemployment insurance (federal and state) and licensing fees. Of the group, worker's compensation and unemployment insurance have been escalating at an unusually high rate.

These fees are a result of your company's experience and the ratings scale for your business's location. Knowing your rates for these costs and their pattern for the increase over the past three years will provide you with some insight as to the costs you should anticipate changing to determine the billing rate for an employee.

Cost model

As related earlier, you are paying for 610 hours of unproductive time per employee per year. Based on a typical employee's wages of \$8 per hour, that's \$4880 per employee per year.

Costs for mandatory benefits, based on \$8 per hour or \$16,640 per year, could be calculated as such:

FICA (7.5% of \$16,640)	\$1268
Fed. unemployment (.8% of \$16,640) ..	135
State unemployment (3.5% of \$16,640) 609	
Worker's comp. (2.8% of \$16,640) ...	473
Total statutory costs	\$2486

Voluntary payroll costs are benefits which you can elect to pay. In many markets, employers see most of these benefits as necessary costs in order to retain or attract employees. The types of these costs and the amounts might be, for the same employee:

Long term pay (1.843% of \$16,640) ..	\$312
Short term pay (.483% of \$16,640)	82
Life insurance (1.78% of \$16,640)	301
Medical single (\$68.55 x 12 mos.)	823
Retirement (4.66% of \$16,640)	788
Uniform services (\$25/mo. x 12)	300
Outside educational program	100
Total typical voluntary costs	\$2705

Summary

As you evaluate whether you can afford to pay any additional benefits for your employee, you need to focus on how much more efficient your employees can become. For most individuals, maximum productivity or efficiency occurs when they are billing or productive for 65 percent of the total time they are compensated. How is the efficiency factor for your employees? Should you be providing better benefits to retain and attract a higher caliber of individual to your company?

LM

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Circle No. 117 on Reader Inquiry Card

COOL SEASON DISEASE CONTROL

When confronted with disease in turfgrass, landscape managers must contend with diagnosing, treating and avoiding resistance to fungicides.

by Peter Landschoot, Ph.D., Penn State University

Of all the pests of turf, disease presents perhaps the most challenging problems.

Symptoms are helpful in disease diagnosis but are often unreliable if they are not observed during the early stages of development. Another difficulty in disease management is obtaining adequate control before the problem gets out of hand.

Root and crown disease

The major root and crown diseases that affect cool-season turf in the United States include take-all patch, summer patch, necrotic ring spot, and pythium root rot. Take-all patch, necrotic ring spot and summer patch are generally referred to as the patch diseases, although a distinction should be made between patch diseases caused by root pathogens and those caused by foliar pathogens (i.e. brown patch, fusarium patch, yellow patch and pink patch).

The first indication of patch disease is the presence of dark brown mycelium (sometimes called ectotrophic mycelium or tunner mycelium) on the root surface that cause root discoloration. Unfortunately, this is virtually impossi-

ble to detect without a microscope and special preparation of the root tissue. By the time the patches are visible, extensive root damage has occurred and curative treatment is ineffective. This is the main reason why root and crown diseases are so difficult to manage.

Golf courses a target

Take-all patch is almost exclusively a disease of bentgrass golf course greens and fairways.

Symptoms of take-all patch typically appear as circular patches of dead or dying turf ranging from a few inches to several feet in diameter. Under conditions favorable for disease development, patches may coalesce and destroy large areas of turf. Since the roots and crowns of affected plants are usually destroyed, recovery of the turf is slow. Undesirable plants such as annual bluegrass or broadleaf weeds often colonize the patches.

Take-all patch occurs more frequently on sandy soils, soils low in phosphorus and potassium, and in soils of high pH (7.0 or greater).

Take-all patch is one of the most difficult diseases to control on golf course turf. Most fungicides that control other turf diseases do not consistently control take-all patch.

Manipulating cultural practices is usually the most effective means of managing this disease.

Stripe smut appears in Kentucky bluegrass and bentgrass as black streaks along the length of leaf blades.

Previous studies have shown that reducing the soil pH by adding acidifying fertilizers (such as ammonium sulfate and ammonium chloride) or sulfur can reduce the its severity. Correspondingly, applications of lime are not recommended on turf affected with take-all patch.

Making certain that soil phosphorus and potassium levels are not deficient will help to increase turfgrass resistance to this disease.

Bane of bluegrass

Summer patch is one of the most destructive diseases of Kentucky bluegrass and annual bluegrass in the Northeast and Midwest. It has also become a problem on fine fescues in some areas.

Once established, summer patch destroys the roots and crowns of affected plants, causing death of the turf. Summer patch usually occurs during extended periods of high temperatures (83-95°F) and high humidity.

Recent studies at the University of Maryland have shown that the disease is more likely to occur in moist soils than under drought-stress conditions. The peak disease period occurs following heavy rains during warm, hot days in the summer. Summer patch is frequently observed in heavily-trafficked turf and in areas with poor soil drainage and reduced air circulation.

Since summer patch is a root and crown disease, cultural practices that promote good root growth will help reduce disease severity. Increased aeration and improved drainage on compacted and poorly-drained soils will alleviate some root inhibition. It will also enable the turf to better resist infection by the causal fungus.

Because low mowing heights are conducive to plant stress and shallow rooting, raising the height of cut may result in less summer patch injury. Reducing populations of susceptible species and encouraging more resistant species such as perennial ryegrass or creeping bentgrass is another means of reducing summer patch injury.

Summer patch can be controlled with fungicides, provided that: (1) applications are properly timed, (2) the most effective products are used at the correct rates, and (3) the fungicides reach the roots and crowns before the tissues are extensively invaded.

The best response has been achieved by applying the fungicides on a preventive basis, usually three to four weeks before symptoms are likely to appear.

Fungicides must reach roots and crowns to prevent or stop the infection. Since most systemic fungicides do not move efficiently from foliar portions of

the plant to the root tissue, the fungicides should be applied so they can reach the roots.

One means of distributing fungicides into the root zone is by applying large amounts of water (5 to 10 gallons/1000 sq. ft.). Similar results can be obtained by irrigating immediately after fungicides are applied. It is important that the fungicide not be allowed to dry on the foliage before watering.

Ring spot hard to stop

Necrotic ring spot is primarily a disease

disease development.

Although more research needs to be conducted on the control of pythium root rot with fungicides, trials in Upstate New York have shown that Aliette (fosetyl) and Subdue (metalaxyl) reduce populations of the causal fungi when watered in immediately following application.

New resistance strategies

Fungicide resistance results from the repeated, continuous use of fungicides with the same or similar



Dollar spot can infect all cool-season turfgrasses. Lesions are white, often with brown borders. Look for white mycelium in early morning.

of Kentucky bluegrass lawns in the Northeast, Midwest, and Northwest.

This fungus is also the causal agent of a disease of bermudagrass known as spring dead spot. Necrotic ring spot can affect most cool-season grasses; however, the grasses most often damaged by this disease are Kentucky bluegrass and fine fescues. Sometimes, this disease has been found on annual bluegrass golf course greens in New Jersey and Pennsylvania.

Necrotic ring spot usually occurs in late spring and/or early fall. The disease can also appear in the summer on drought-stressed turf. Research has begun to determine other factors responsible for disease development.

One of the most effective management practices for reducing the severity of necrotic ring spot is overseeding with perennial ryegrass.

Pythium root rot is characterized by thinning of the turf in small, tan-colored patches. It may progress to destroy large areas of grass. This disease is caused by several pythium species that can infect roots under cool (45-60 °F), moist conditions. This disease typically occurs in early spring or late fall.

The severity of pythium root rot can be reduced by using management practices that promote root development and reduce excessive soil moisture. However, fungicide applications may be justified when conditions are favorable for

modes of action. This has been a particular problem of systemic fungicides because they tend to have a narrower mode of action than most contact fungicides.

One type of resistance occurs when the initial pathogen population consists of members that are either very sensitive to the toxic effects of a particular fungicide or are very resistant. Loss of control is sudden and dramatic.

Another type of resistance occurs when the population consists of members that are very sensitive, slight or intermediate in sensitivity, slight or intermediate in resistance, or very resistant to a particular fungicide. Following continuous repeated use of the fungicide, loss of control is gradual.

Should a fungicide program be necessary, it is important to design a strategy to delay or prevent the onset of resistance. Two conventional approaches to preventing resistance have been to alternate fungicides with dissimilar modes of action.

A combined approach

A recommendation often made by plant pathologists is to mix a contact with a systemic fungicide. Whereas this approach appears logical (since systemics and contacts have distinct modes of action), there is some evidence that suggests that this is not the best resistance prevention strategy available.

A more logical approach is to combine two or more systemic fungicides with different modes of action. This eliminates combining contacts and systemics. Unfortunately, mixtures of

systemics at full-label rates are costly and may result in turf injury. Turf managers should take the threat of resistance seriously and avoid continuous and repeated use of fungicides

with narrow modes of action.

LM

Dr. Landschoot is an assistant professor of turfgrass science at Penn State University.

TABLE 1

Diagnostic Features of Common Cool Season Turfgrass Diseases

Disease	Causal Agent(s)	Symptoms/Signs	Susceptible Grasses
Anthrachnose	<i>Colletotrichum graminicola</i>	Yellowing of leaf blades associated with a black crown rot. Pin cushion-like fruiting bodies with small, spiny projections can be seen with a hand lens.	Annual bluegrass, bentgrasses, and fine fescues.
Brown patch	<i>Rhizoctonia solani</i>	Large, circular brown patches or thinning of turf. On low-cut turf, patches often surrounded by dark rings. White, cottony mycelium may be present on high-cut turf in early morning.	Bentgrasses, ryegrass, tall fescue.
Dollar spot	<i>Lanzia spp.</i> <i>Moellerodiscus spp.</i> (<i>Sclerotinia homeocarpa</i>)	Small, bleached patches of dead grass appear in turf. Lesions on leaves are white, often with brown borders. White, cottony mycelium may be present on dew-covered turf in early morning.	All cool-season turfgrasses.
Fairy ring	<i>Basidiomycete fungi</i>	Dark-green rings become apparent in mature turf. Mushrooms often present around periphery of ring.	All cool-season turfgrasses.
Leaf spot/ melting out	<i>Drechslera</i> and <i>Bipolaris spp.</i>	Small tan lesions with purple or brown borders on leaf blades. In severe cases, the crowns are rotted and the turf may be significantly thinned.	Primarily Kentucky bluegrass. Other cool-season grasses may be affected.
Necrotic ring spot	<i>Leptosphaeria korrae</i>	Large ring-shaped patches, usually creating depressions in turf. Roots and crowns show brown or black rot.	Primarily Kentucky bluegrass. In some cases, fine fescues and annual bluegrass.
Powdery mildew	<i>Erysiphe graminis</i>	White, fluffy mycelium on leaf blades, usually present on turf growing in shaded areas.	Kentucky bluegrass.
Pythium blight	<i>Pythium aphanidermatum</i> & other <i>Pythium spp.</i>	Irregular patches of blighted turf. White, dense, cottony mycelium growing in turf in morning.	Perennial ryegrass, bentgrasses, tall fescue.
Pythium root rot	<i>Pythium spp.</i>	Small bleached patches of turf may progress to large blighted areas, crowns and roots rotted.	Bentgrasses, annual bluegrass, Kentucky bluegrass.
Red thread/ Pink patch	<i>Laetisaria fuciformis</i> / <i>Limonomyces roseipellis</i>	Small red to pink patches of blighted turf. Long, slender threads of red mycelium (red thread), or fluffy, pink mycelium (pink patch) growing out of foliage.	Fine fescues, perennial ryegrass, Kentucky bluegrass.
Rust	<i>Puccinia spp.</i>	Yellowing of leaves often apparent. Brown pustules occurring on leaves and stems.	Tall fescue, perennial ryegrass, Kentucky bluegrass.
Slime molds	<i>Myxomycetes</i>	Blue or tan-colored spore-like structures on leaves.	All cool-season turfgrasses.
Snow mold (grey)	<i>Typhula incarnata</i>	Large patches of matted turf appearing at snow melt. Gray mycelium and orange resting structures often present on affected foliage.	All cool-season turfgrasses.
Snow mold (pink)	<i>Microdochium nivale</i>	Small patches of matted turf with pink or reddish color on the leaves.	All cool-season turfgrasses.
Stripe smut	<i>Ustilago striiformis</i>	Black streaks of spores along length of leaf blades. Shredding of leaf blades.	Kentucky bluegrass and bentgrass.
Summer patch	<i>Magnaporthe poae</i>	Large yellow or tan ring-shaped patches. A root and crown rot is usually apparent.	Bluegrass and fine fescues.
Take-all patch	<i>Gaeumannomyces graminis</i>	Patches of dead or dying turf ranging from a few inches to several feet in diameter.	Bentgrasses.

Source: Dr. Landschoot

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TABLE 2

Generic & Trade Names of Common Turfgrass Fungicides

Generic Names	Contact (C) or Systemic (S)	Common Trade Names ¹
Anilazine	C	Dyrene
Benomyl	S	Tersan 1991, Lesco Benomyl, Lebanon Benomyl
Chloroneb	C	Tersan SP, Teremec SP, Proturf Fungicide II
Chlorothalonil	C	Daconil 2787
Ethazol (etridiazole)	C	Koban, Terrazole
Fenarimol	S	Rubigan
Fosetyl-Al	S	Aliette
Iprodione	S	Chipco 26019, Proturf Fungicide VI
Mancozeb	C	Fore, Formec, Dithane F-45, Lesco Mancozeb, Manzate 200 DF
Maneb	C	Dithane M-22
Maneb + zinc sulfate	C + C	Tersan LSR, Dithane M-22 w/Zinc, Lesco 4 F w/Zinc
Mercury chloride	C	Calo-Clor, Calo-Gran
Metalaxyl	S	Subdue, Proturf Pythium Control
Metalaxyl + mancozeb	S + C	Pace
Pentachloronitrobenzene (quintozone)	C	Terraclor, Turfcide, Proturf FF II, Lesco PCNB
Phenylmercuric acetate	C	PMAS
Phenylmercuric acetate + thiram	C + C	Proturf Broad Spectrum Fungicide
Propamocarb	S	Banol
Propiconazole	S	Banner
Thiophanate-ethyl + thiram	S + C	Bromosan
Thiophanate-methyl	S	Fungo 50, Spot-Kleen, Clearys 3336, Topsin M, Proturf Systemic Flugicide
Thiophanate-methyl + mancozeb	S + C	Duosan
Thiophanate-methyl + iprodione	S + C	Proturf Fluid Fungicide
Thiram	C	Tersan 75, Spotrete, Thiramad, Lesco Thiram
Triadimefon	S	Bayleton, Proturf Fungicide VII, Lebanon Turf Fungicide
Triadimefon + metalaxyl	S + S	Proturf Fluid Fungicide II
Triadimefon + thiram	S + C	Proturf Fluid Fungicide III
Vinclozolin	S	Vorlan

¹ Products may be available only through specialized dealers or only in large quantity. Some products can be purchased and applied only by licensed pesticide applicators. This list is presented for information only. No endorsement is intended for products mentioned, or is criticism meant for products not mentioned.

Source: Dr. Landschoot

Biologicals: the new frontier

Biological control is the reduction of disease-producing activities of a pathogen by another organism.

Biological control is a natural occurrence in turf and is a primary reason why diseases do not destroy all of our lawns, grounds and golf courses.

Organisms that limit the disease-producing activities of a pathogen are referred to as antagonists. Antagonists are usually microorganisms (fungi, bacteria, viruses, nematodes, or actinomycetes) that interfere with the growth and spread of the pathogen. Antagonists may be introduced by artificial means or they may already be present in the turfgrass ecosystem.

Antagonists produce compounds that inhibit the pathogen—antibiotics, for example—or more directly, parasitize the pathogen. The direct application of antagonists is likely to result in failure unless provisions are made for it to successfully compete in turf. Direct application of an antagonist that is not adapted to the turf ecosystem is like sending a soldier into battle without a rifle. The pathogen and the other resident microorganisms are usually well equipped to outcompete and fend-off the introduced antagonist.

Another method of biological control that has yielded success with some turf pathogens is the use of pathogen-suppressive soils. Suppressive soils are those in which the pathogen does not establish or persist in populations great enough to cause severe disease damage. Suppressive soils have been implicated as a factor responsible for the absence or decline of take-all patch of bentgrass turf. Take-all patch usually develops on recently-sterilized soils or on golf courses that were formerly woodland or wetland sites and do not have large populations of resident antagonists.

Over three to five years, the disease begins to disappear from these sites, a phenomenon known as "take-all decline." Studies have shown that the transfer of a small amount of soil from sites where take-all decline has occurred to areas in which the disease is active, resulted in suppression of the disease. Studies in Australia have revealed that suppressive soils can be developed in the laboratory and used as a top dressing to control take-all patch. Suppressive soils have also been reported for other pathogens including various species of fusarium, pythium, and rhizoctonia. To my knowledge, there are no companies

that are marketing pathogen-suppressive soils for use on turf.

continued on page 44

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TABLE 3

Methods of Disease Control for Cool-season Turfgrasses

Disease	Cultural control	Chemical control	Resistant species/varieties
Anthraxnose	Fertilize to maintain vigor, improve drainage, aeration, and raise mowing height during periods of heat stress.	benomyl, chlorothalonil, mancozeb, propiconazole, triadimefon	Bentgrasses are less susceptible than annual bluegrass on putting greens.
Brown patch	Avoid excess N in summer, increase air circulation, avoid excessive watering, improve drainage.	anilazine, benomyl, chlorothalonil, iprodione, mancozeb, maneb, thiophanates, thiram, vinclozolin	Kentucky bluegrasses are less susceptible to brown patch than other cool-season turfgrasses.
Dollar spot	Avoid N deficiency, maintain good soil moisture, remove guttation and dew from leaf surfaces, avoid night watering.	anilazine, benomyl*, chlorothalonil, fenarimol, iprodione, mancozeb, propiconazole, thiophanates, thiram, vinclozolin	Resistant Kentucky bluegrass varieties include Adelphi, America, Aspen, Challenger, Eclipse, Escort, Nassau, Somerset, & Wabash.**
Fairy ring	Use clean fill during establishment, irrigate, or mask symptoms with N-fertilizer or iron.	None effective, must fumigate with soil sterilant to eradicate the fungus (this will also kill grass).	No resistant species or varieties are available.
Leaf spot/melting out	Avoid excess N applications in early spring, mow 2" in height, avoid light, frequent irrigation. Do not use benomyl, thiophanates, or triadimefon to control this disease.	anilazine, chlorothalonil, iprodione, maneb, mancozeb, vinclozolin	Resistant Kentucky bluegrasses include: Adelphi, Bristol, Destiny, Eclipse, Enmundi, Glade, Ikone, Leberty, Majestic, Mona, P-104, Rugby, and Somerset.**
Necrotic ring spot	Manage turf for maximum root growth, irrigate to maintain good soil moisture, maintain mowing height at 2" or above.	benomyl, fenarimol, propiconazole	Perennial ryegrasses are resistant.
Powdery mildew	Reduce shade and improve air circulation.	benomyl, fenarimol, propiconazole, triadimefon (fungicides usually not required)	Use grasses adapted to shaded areas such as fine fescues and rough bluegrass. Resistant Kentucky bluegrasses include: A-34, Glade, Touchdown, & Eclipse.**
Pythium blight	Improve drainage, increase air circulation, avoid excess N, reduce irrigation.	chloroneb, etridiazole, metalaxyl*, Fosetyl-Al, propamocarb	Kentucky bluegrass is less likely to be damaged by Pythium blight than other turfgrasses.
Pythium root rot	Increase drainage, aerate	Fosetyl-Al, Subdue as a drench	unknown
Red thread/pink patch	Maintain adequate fertility of turf (especially N)	anilazine, benomyl***, chlorothalonil, iprodione, propiconazole, thiophanates***, triadimefon, vinclozolin	Resistant perennial ryegrasses include: Allaire, Commander, Delray, Manhattan II, Palmer, Pennant, Prelude, Regal, Regency, SR 4000, SR 4100, and Yorktown II.**
Rust diseases	Avoid N-deficiency and drought-stress (especially in late summer/early fall)	maneb, mancozeb, fenarimol, propiconazole, triadimefon (fungicides usually not required)	Some resistant Kentucky bluegrasses include: Kenblue, Parade, Rugby, A-34, and Classic**.
Slime molds	Remove spores by spraying water on leaves or brushing turf.	None required.	Not applicable since grasses are not infected.
Snow molds: Gray snow mold	Avoid excess N in fall before grass goes dormant, mow until top growth ceases in fall, prevent accumulation of snow in sensitive areas, rake up mats (patches) in spring to speed recovery.	Fungicides should be applied in late fall before snow cover: chloroneb, fenarimol, iprodione, mercury fungicides, PCNB, thiophanates, thiram, triadimefon, vinclozolin	Some resistant Kentucky bluegrasses include: Adelphi, Aspen, Enmundi, Plush, and Vantage**.
Pink snow mold	(Same as for gray snow mold)	benomyl, fenarimol, iprodione, mancozeb, mercury fungicides, PCNB, thiophanates, thiram, vinclozolin	Most fine fescues and Kentucky bluegrasses are moderately resistant to this disease.
Stripe smut	Avoid excess N in early spring, avoid drought stress in early summer.	Apply fungicides in early spring or late fall, water-in for good root uptake. Benomyl, fenarimol, propiconazole, thiophanates, triadimefon	Ryegrasses, tall fescues, and the fine fescues are less susceptible to this disease than Kentucky bluegrass.
Summer patch	Avoid low mowing heights, reduce compaction, avoid overwatering in summer, improve drainage.	benomyl, fenarimol, propiconazole, thiophanates, triadimefon	Resistant Kentucky bluegrasses include Adelphi, Enmundi, Sydsport, and Touchdown.
Take-all patch	Use acidifying fertilizers or sulfur to lower pH, avoid P and K deficiency.	Sterol biosynthesis inhibitors may have some benefit if applied prior to root infection.	annual bluegrass

* Resistance has been recorded.

** Based on National Turfgrass Evaluation Program and Penn State data. No endorsement of cultivars is intended for those mentioned, or is criticism meant for cultivars not mentioned.

*** Controls red thread and not pink patch.

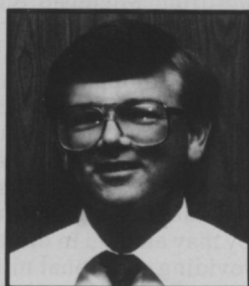
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Jerry Roche

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"The article referred to the death of Navy Lt. George Prior. I know. I was at the Senate subcommittee hearing. Prior died from toxic epidermal necrolysis (TEN), which was caused by a viral infection. On May 9, 1988, a trial court in the Prior family's case against the company that manufactures Daconil 2787 (Fermenta ASC, Mentor, O.) entered judgment in favor of the defendant..."

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"Writing in the journal *Science*, Dr. Bruce Ames, Chairman of the Department of Biochemistry at the University of California, Berkeley, noted: 'One glass of beer a day may pose 10,000 times greater possible human cancer hazard than would daily dietary intake of several common pesticide residues.'"

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If you would like a copy of the complete editorial rebuttal, contact Associate Publisher Jon Miducki at (216) 826-2855.

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CALENDAR

COMMON DISEASES OF COOL-SEASON TURF

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
			Anthracnose								
					Brown Patch						
					Dollar Spot						
			Leaf Spot/Melting Out								
			Necrotic Ring Spot					Necrotic Ring Spot			
						Pythium Blight					
			Red Thread/Pink Patch								
							Rust				
Snow Molds										Snow Molds	
					Stripe Smut						
					Summer Patch						

Biologicals:

from page 40

Organics an alternative?

Most of the current interest in biological control of turf pathogens is centered around the use of natural organic fertilizers or organic soil amendments. This practice has been successfully employed with other crops and some success has been achieved in controlling turfgrass diseases. Research at Cornell University has shown that some organic amendments suppressed dollar spot and brown patch diseases when applied as a topdressing to a bentgrass putting green.

Similar results have been obtained by researchers from Michigan State University and The University of Rhode Island for the suppression of necrotic ring spot. Although we do not understand the exact mechanisms involved, there is some evidence to suggest that these products stimulate populations of resident antagonists to levels that will suppress some turf diseases. They may also aid in disease control by providing additional nitrogen to the plant.

LM

—Dr. Landschoot

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Phythium blight is culturally managed by improved drainage, reduced irrigation and a moderate nitrogen diet. Chemical control includes chloroneb, ethazol and metalaxyl.

DISEASE CONTROL IN WARM-SEASON TURF

Integrated disease management first requires the selection of appropriate turfgrass species and cultivars. Proper cultural practices, pesticides, and biological control components follow.

by Monica L. Elliott, Ph.D., University of Florida

Although we can easily divide turfgrasses into cool- and warm-season types, it is people who determine the grass grown in any particular landscape. But people do not necessarily follow the rules. The result is that we find bentgrass grown in Florida and bermudagrass grown in the central U.S.

To confuse the issue even further, we have bermudagrass putting greens over-seeded with ryegrass or bentgrass during the winter months in the southern states. The primary goal is to have attractive turfgrass areas; diseases, however, can quickly

blemish this picturesque setting.

Knowing the difference

While turfgrass injuries or disorders may look like diseases, they are not diseases and should not be treated as such.

A disease is primarily an interaction between the plant and a pathogen. It consists of three components: turfgrass host, pathogen and the environment in which the host and pathogen interact. In most turfgrass situations, the environment is the key factor in disease development, since the other two components are virtually always present.

While turfgrasses may be affected by diseases all year long, individual turf diseases are prominent for only a few months each year, based normally on weather patterns/environmental effects. Since it is usually not practical to eliminate the turfgrass host, disease control recommendations are aimed at (1) suppressing the pathogen, and (2) altering the environment so it is less favorable for disease development.

Turfgrass selection

Select turfgrass species and cultivars based on your geographical location

TABLE 1

Diagnostic Features of Common Warm-Season Turfgrass Diseases

Disease	Casual agent(s)	Symptoms/signs	Susceptible grasses
Anthracnose	<i>Colletotrichum graminicola</i>	Brown lesion with yellow halo expands to cause yellowing of entire leaf blade. Tiller infection results in stem girdling. Fruiting bodies are dark cushion-like bodies with small black spines and can be seen with hand lens.	bahiagrass, bermudagrass and centipedegrass*
Bermudagrass decline	<i>Gaeumannomyces</i> spp. or similar fungi as yet undetermined.	Begins as small, irregular, yellow patches which expand and thin-out as grass dies. Roots are short, thin and rotted. Usually observed first at edges of putting greens.	bermudagrass*
Brown patch (Rhizoctonia blight); Rhizoctonia leaf and sheath spot	<i>Rhizoctonia solani</i> , <i>R. zeae</i> , <i>R. oryzae</i>	Begin as small circular light green patches that turn yellow and then brown or straw-colored. Patches expand to several feet in diameter. Turf at outer margin of patch may appear dark and wilted (smoke ring). Whole leaf fascicles pull up easily due to basal rot of leaf sheath. Aerial blight common with centipedegrass and St. Augustinegrass. During warm summer months, may also observe distinct light brown foliar lesions.	Bahiagrass, bermudagrass, centipedegrass*, St. Augustinegrass*, and zoysiagrass*
Dollar spot	<i>Lanzia</i> spp. and <i>Moellerodiscus</i> spp. (<i>Sclerotinia homoeocarpa</i>)	Small, bleached patches of dead grass that do not expand but do coalesce with other spots to form large patches. Irregular, light tan lesions with distinct brown borders. White, cottony mycelium may be observed in early morning when dew is present.	bahiagrass*, bermudagrass*, centipedegrass, St. Augustinegrass, zoysiagrass*
Cercospora leaf spot	<i>Cercospora fusimaculans</i>	Small, dark brown or purple lesions on leaf blade and sheath that become tan color with age. High disease severity results in leaf death and turf areas that thin-out.	St. Augustinegrass*. Bitter-blue cultivars are less susceptible than yellow-green cultivars.
Fairy ring	<i>Chlorophyllum</i> , <i>Marasmius</i> , <i>Lepiota</i> and other basidiomycete fungi	Circular to semi-circular bands of dark green turf with or without mushrooms present in band. Some rings are bands of dead turf. Rings expand each year.	All warm-season turfgrasses.
Gray leaf spot	<i>Pyricularia grisea</i>	Lesions begin as small, brown spots that expand into oval areas with tan centers and dark purple or brown margins. Yellow halo may be present. During warm humid weather, lesions covered with gray velvet mat of mycelium. Leaves wither resulting in scorched appearance.	St. Augustinegrass*. Yellow-green cultivars are less susceptible than blue-green/bitter-blue cultivars. St. Augustinegrass treated with the herbicide atrazine is more susceptible.
"Helminthosporium" Leaf Spot/Melting Out	<i>Bipolaris</i> , <i>Drechslera</i> and <i>Exserohilum</i> spp. (previously <i>Helminthosporium</i> fungi); and <i>Curvularia</i> spp.	Leaf spot symptoms vary with specific pathogen and host from small, solid brown to purple lesions to expanded lesions with bleached centers that girdle the leaf blade. Severely infected leaves turn reddish-brown to straw color. "Melting-out" occurs under severe infection as turf areas thin and die. Lesions on stems are dark purple to black. Crown/root rots will also occur.	Bermudagrass*, St. Augustinegrass, zoysiagrass
Pythium Blight	<i>Pythium</i> spp.	Small, distinct patches of grass that first appear dark and water-soaked but later turn straw-color. No distinct leaf lesions. Patches spread quickly in "streak" pattern. Cottony mycelium may be observed in early morning when dew present.	All warm-season turfgrasses, primarily Bermudagrass*
Pythium Root Rot	<i>Pythium</i> spp.	General turf browning and thinning. Roots appear thin with few root hairs and have a general discoloration. Turf does not respond to N applications.	All warm-season turfgrasses.
Rust	<i>Puccinia</i> spp.	Orange to reddish brown pustules on leaves. Severe infections cause yellowing of leaves and thin turf.	Bermudagrass, St. Augustinegrass and Zoysiagrass*
Spring dead spot	<i>Leptosphaeria korrae</i> , <i>Ophiosphaerella herpotricha</i> and <i>Gaeumannomyces graminis</i> var. <i>graminis</i> .	Large, circular patches of bleached, dead grass that appear as dormant turf resumes growth in spring. Root, crown and stolon rot evident.	bermudagrass*
St. Augustinegrass decline	St. Augustinegrass decline virus (<i>Panicum mosaic virus</i>)	Initially, observe chlorotic (yellow) mosaic or mottle on leaf blades that gradually becomes more extensive until area appears uniformly yellow and thin. Death may eventually occur.	centipedegrass and St. Augustinegrass* (some cultivars).

* denotes most susceptible turfgrass species

and on how the turf will be used and maintained.

Grasses that are not suited for a particular area will be continually stressed, more susceptible to disease, and require increased maintenance costs in terms of labor and pesticides. An area subjected to heavy foot traffic would not be suitable for centipedegrass. Non-irrigated areas would be satisfactory for bahiagrass but not St. Augustinegrass.

Sometimes turfgrass is not even the appropriate plant for a particular landscape. For example, most warm-season turfgrasses do not thrive in heavily shaded areas. Certain cultivars of some turf species are resistant to specific diseases. Selecting disease-resistant cultivars is especially important for controlling viral diseases, in part because there are no chemicals to control these diseases.

The primary viral disease associated with warm-season turfgrasses is caused by the St. Augustinegrass decline virus. It is most frequently observed in centipedegrass and susceptible St. Augustinegrass cultivars. It is normally a mild pathogen of centipedegrass of which there are no resistant cultivars.

However, a number of St. Augustinegrass cultivars are resistant to this virus, including Floratam, the most popular cultivar. Therefore, before you plant a single seed or blade of grass, consult with your local experts to determine the most appropriate turfgrass to plant and then make sure the correct material is installed.

Cutting height matters

Cultural practices should promote an environment that is not conducive for pathogen infection and disease development.

If a disease should affect the turfgrass, these practices should be implemented first or, at the very least, implemented at the same time fungicides are applied.

Mowing is the most common turf maintenance operation. Every time a mower removes leaf tissue, a wound is created through which a pathogen may enter the plant. However, turfgrasses that are cut below their optimum height will be stressed and more susceptible to some diseases.

Always use a sharp mower blade. Turf with active disease areas should be mowed last, as mowers may actually spread the pathogen from one location to another. Likewise, clean the equipment between jobs. A thorough rinse with water is sufficient to remove clippings and debris which may carry plant pathogens.

Not too short on greens

Raise the blade height on golf course

Biological control testing continues

Biological control of turfgrass diseases is a new area of disease management that is still in the experimental research phase for warm-season turfgrasses.

Testing is currently in progress concerning the use of non-pathogenic fungi and bacteria for control of turfgrass diseases. However, the most active area of research involves the use of organic fertilizers for disease suppression. These products are thought to stimulate the devel-

opment of microorganisms which antagonize turfgrass pathogens. In both cases, further testing is required to substantiate their value in the consistent control of turfgrass diseases and the proper methods for their use. When that is accomplished, biological control will be routinely incorporated into an integrated turfgrass management program.

—Dr. Elliott □

putting greens with active disease areas. Over the past few years, the height of cut on greens has been reduced substantially; $\frac{3}{16}$ inch or lower is the standard on bermudagrass putting greens. The low height of cut reduces the tissue necessary for photosynthesis, the process by which the plant produces energy.

In addition, diseases eventually reduce the leaf canopy and photosynthesis is reduced even further.

It has often been suggested that leaf clippings should be collected when a leaf disease is active. Clippings disposal is no longer ecologically acceptable and will become illegal in some states in the near future. In general, do not collect leaf clippings unless you have an acceptable method for recycling the material.

A properly constructed compost will kill the pathogen, so you will not infect a turfgrass area by using this composted material in the landscape. In addition, recent studies suggest that using a mulching lawnmower blade with a closed mower deck may help to limit leaf diseases when it is necessary to return clippings to a turf area.

Managing water

Most fungal pathogens require free water or very high humidity to start the infection process. Dew (more importantly, the length of the dew period), which depends on temperature and humidity, is a critical factor. Extending the length of the dew (free water) period by irrigating in the evening before dew forms or in the morning after the dew evaporates extends the dew period. Therefore, irrigate when dew is already present, usually in the pre-dawn hours.

When you do irrigate, apply enough water each time to adequately soak the entire root system. Irrigate to the depth of the roots, but not below them. Shallow irrigations will require you to irrigate more frequently and

thus increase the chances for pathogen infection and pathogen movement.

Importance of nitrogen

Many diseases are also influenced by the nutritional status of the grass, especially nitrogen. Both excessively high and low nitrogen fertility contributes to turfgrass diseases. Higher nitrogen applications encourage rhizoctonia diseases, gray leaf spot, helminthosporium leaf spot and pythium blight. Lower nitrogen levels encourage dollar spot, rusts and anthracnose.

Remember: it is easier to add nitrogen to the soil but impossible to remove it. If a foliar disease is active, select a fertilizer blend with a high percentage of the slow-release component and a low percentage of the rapid-release component. This will allow you to "feed" the turf without "feeding" the pathogen.

Note that no single environmental factor influences disease development. One example is centipede decline. Although no specific pathogen has been documented as the causal agent, we do know that excessive fertilization and irrigation contribute to the decline. Dollar spot is another example. Three factors encourage this disease: nitrogen deficiency, dry soils, and high moisture levels surrounding the leaves. Frequent, short irrigation periods in addition to dew periods lead to the dry soils and high leaf humidity. Although fungicides are available for controlling this disease, correcting the three diseases development factors, especially the plant's nitrogen status, will achieve the same goal. Physical and chemical soil properties may not affect disease development directly, but they do affect turfgrass health.

Maintain pH levels

Soil pH is an important growth factor. For example, centipedegrass and



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TABLE 2

Methods of Disease Control for Warm-season Turfgrasses

Disease	Cultural control	Chemical control	Resistant species/varieties
Anthraconse	Avoid fertility imbalances, improve drainage and remove excessive thatch. Stress due to insects or nematodes should be eliminated.	benomyl, chlorothalonil, fenarimol, mancozeb, propiconazole, thiophanate methyl, triadimefon	No resistant centipedegrass cultivars are available.
Bermudagrass decline	Aerate and topdress greens monthly during late spring, summer and early fall. Apply $\text{NH}_4\text{-N}$ rather than $\text{NO}_3\text{-N}$. Balance N with K and apply micronutrients. Raise mowing height during disease outbreaks.	benomyl, fenarimol, propiconazole, thiophanate methyl, triadimefon	No resistant cultivars are available.
Brown patch	Avoid excess N, especially readily available forms of N. Avoid excessive irrigation.	anilazine, benomyl, chlorothalonil, iprodione, maneb, mancozeb, PCNB, thiophanate methyl, thiram. Do NOT use benomyl or thiophanate methyl if causal agent is <i>R. oryzae</i> or <i>R. zeae</i> . Use fenarimol, propiconazole and triadimefon as preventative and not curative compounds.	No resistant species are available.
Cercospora leaf spot	Avoid N deficiency. Irrigate deeply and less frequently.	None are currently labeled. Contact fungicides such as chlorothalonil, iprodione or mancozeb may provide disease suppression.	Bitter-blue selections of St. Augustinegrass are less susceptible.
Dollar spot	Avoid N deficiency. Irrigate deeply and less frequently.	anilazine, benomyl, chlorothalonil, fenarimol, iprodione, mancozeb, maneb, propiconazole, thiophanate methyl, thiram, triadimefon, vinclozolin	No resistant species are available.
Fairy ring	Mask symptoms with N fertilizers. Remove mushrooms as some are poisonous. Before planting, eliminate large sources of organic matter such as tree stumps, wood building materials, etc.	None are currently registered. To eliminate fungus, fumigate with soil sterilant and replant.	No resistant species are available.
Gray leaf spot	Avoid excess N. Irrigate deeply and only when necessary.	chlorothalonil, propiconazole, thiophanate methyl + mancozeb	Yellow-green cultivars of St. Augustinegrass are less susceptible. St. Augustinegrass treated with the herbicide atrazine is more susceptible.
"Helminthosporium" leaf spot/melting out	Avoid excess N. Balance fertility components. Irrigate deeply and less frequently. Avoid thatch accumulation. Raise mowing height during disease outbreaks.	anilazine, chlorothalonil, iprodione, maneb, mancozeb, propiconazole, vinclozolin	No resistant species are available.
Pythium blight	Improve drainage and air circulation. Reduce irrigation. Avoid excess N.	chloroneb, ethazol, metalaxyl, fosetyl-Al, propamocarb	No resistant species are available.
Pythium root rot	Improve drainage, aerate and reduce irrigation.	chloroneb, ethazol, metalaxyl, fosetyl-Al, propamocarb. Except for fosetyl-Al, these fungicides should be watered into the root zone.	No resistant species are available.
Rust	Avoid N deficiency. Irrigate deeply and less frequently.	anilazine, maneb, mancozeb, propiconazole, triadimefon	No resistant species are available.
Spring dead spot	Avoid low mowing heights, thatch, compaction and excess N.	benomyl, fenarimol, propiconazole, thiophanate methyl	No resistant species of bermudagrass are available.
St. Augustinegrass decline	Do not plant susceptible cultivars.	None. Disease is caused by a virus.	Resistant St. Augustinegrass cultivars are Floratam, Florilawn, Raleigh and Seville.

Source: The author

Daconate[®] 6. The first word in grassy weed control. Bahiagrass. Barnyardgrass. Crabgrass. Chickweed. Dallisgrass. Nutsedge. Sandbur. Woodsorrel. Goosegrass. Cocklebur. Johnsongrass. Buckhorn. Clover. Common Chickweed. Curly dock. Dandelion. English daisy. Ground ivy. Knotweed. Lambsquarters. Mallow. Mouse ear chickweed. Morning glory. Pigweed. Plantain. Purslane. Ragweed. Red clover. Red sorrel. Speedwell. Stitchwort. White clover. Wild garlic. Wild onion. Yarrow. **2 Plus 2. The last word in broadleaf weed control.**

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Gray leaf spot as shown on St. Augustinegrass. Yellow-green cultivars are less susceptible. St. Augustinegrass treated with the herbicide atrazine is more susceptible.

bahiagrass have an optimum soil pH between 5 and 6 whereas zoysiagrass and St. Augustinegrass prefer soil with pH between 6 and 7. A soil pH greatly above or below these optimum values results in turfgrass that is constantly stressed and susceptible to turfgrass pathogens. Soils that are compacted and poorly drained result in stressed turf also, especially of the root system.

Install drainage and aerify regularly to help reduce disease development.

Thatch is a natural component of a turfgrass ecosystem. However, excessive thatch accumulation indicates an imbalance has occurred and plant tissue is being produced more quickly than it is being decomposed. Factors that impede microbial decomposition are excessively wet or dry conditions, very high or low thatch pH, inadequate nitrogen levels and repeated use of chemical pesticides. Thatch accumulation is probably most severe with zoysiagrass and does require periodic renovations.

Chemical control

Except for St. Augustinegrass decline, diseases of warm-season turfgrasses are caused by fungi. Chemical control of these diseases is accomplished by using fungicides. However, chemical controls are all too often implemented without considering cultural controls or understanding the reasons behind disease development.

The next time you spray a fungicide, determine what else you can do to prevent or control disease development. We cannot afford to apply fungicides, or any pesticide, without understanding the reasons for the applications. We must explain our actions intelligently to the public—and emphasize the other actions we have taken to reduce a particular pest.

Fungicides do not eliminate the pathogens from the turfgrass area. They primarily suppress fungal pathogen growth to prevent them from infecting the plant when the environment is conducive for disease development.

Contacts and systemics

Turfgrass fungicides can be divided into

two broad categories based on the location of their activity: (1) contact fungicides and (2) systemic fungicides which include true systemic compounds and local-systemic compounds.

Contact fungicides, generally applied to the leaf and stem surfaces of turfgrasses, act as protective compounds. They should evenly coat the entire leaf surface. These fungicides remain on the plant surface. They remain active only as long as the fungicide remains on the plant in sufficient concentration to inhibit fungi. Leaves which emerge after the fungicide has been applied will not be protected. In addition, fungicide on the plant surface will be gradually lost due to mowing, irrigation, rainfall and decomposition.

Consequently, they are only effective for short durations, usually 7 to 14 days. To obtain optimum protection, contact fungicides should evenly coat the entire leaf surface and be allowed to dry completely before irrigating or mowing. Ideally, the turf area should be mowed and irrigated prior to a fungicide application to allow a maximum time interval between fungicide application and the next turfgrass maintenance operation.

In general, systemic fungicides have curative and protective activities with extended residual activity. Because systemic fungicides are absorbed by the plants, they "work" inside the plant to, (1) control pathogenic fungi which have already entered the plant and initiated a disease (curative action), and, (2) inhibit fungi that enter the plant from initiating a disease (preventive action).

Inside the plant, a systemic fungicide will not be removed by rain or irrigation, and newly emerged leaves may contain sufficient concentrations of the fungicide to protect them from fungal infection.

Systemic fungicides do not need to be applied as often as contact fungicides; usually 15- to 30-day intervals are adequate. Systemic fungicides usually have a very specific mode of action and do not have as broad a spectrum of disease control as contact fungicides. However, they will control both foliar and root/crown pathogens. When attempting to

control the latter, systemic fungicide should be watered into the rootzone immediately after application, since the majority of systemic fungicides are xylem-limited, i.e., they move in an upward direction in the plant. If these fungicides are only applied to the leaf tissue, the compounds may never reach their root target in the amount needed for control.

Local-systemic fungicides are capable of penetrating the plant surface, but only move very short distances within the plant and usually not within the xylem or phloem tissue. The majority of fungicide remain on or near the plant surface. Included in this group of fungicides are iprodione and vinclozolin. These fungicides are primarily protective in activity whereas the true systemic compounds have both curative and protective activities.

Preventing resistance

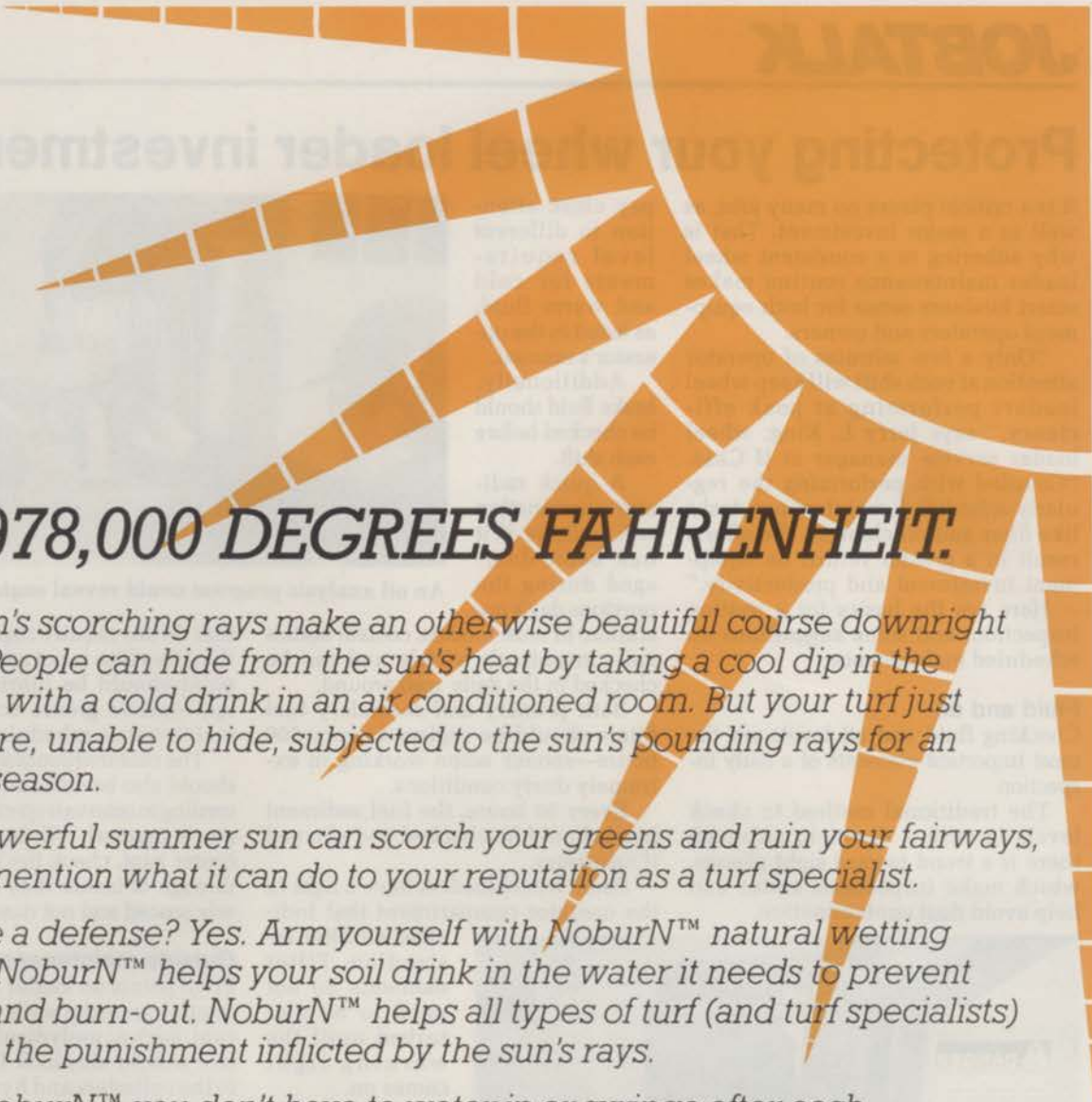
Fungicides are grouped according to their chemical properties. To prevent fungicide resistance from developing in a pathogen population, it is important to know which fungicides belong to the same chemical group or have the same mode of action. Fungicides should be periodically alternated or used in mixtures with fungicides belonging to different chemical groups to prevent fungicide resistance.

Trade names are not an indication of the chemical group. For example, alternating between Tersan 991 (benomyl) and Fungo 50 (thiophanate methyl) does not mean you have alternated between chemical groups, as both fungicides belong to the same chemical group.

If you do not achieve disease control with a fungicide, make sure the disease was properly diagnosed and the fungicide properly applied before assuming that a fungicide resistant strain has developed.

The number of documented cases of fungicide resistance is limited for warm-season turfgrasses. Turfgrass managers can keep it that way by exercising intelligent, prudent use of fungicides. **LM**

Monica Elliott is an assistant professor of turfgrass pathology at the University of Florida in Ft. Lauderdale.



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The sun's scorching rays make an otherwise beautiful course downright nasty. People can hide from the sun's heat by taking a cool dip in the pool or with a cold drink in an air conditioned room. But your turf just lies there, unable to hide, subjected to the sun's pounding rays for an entire season.

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Protecting your wheel loader investment

It is a critical player on many jobs, as well as a major investment. That is why adhering to a consistent wheel loader maintenance routine makes smart business sense for both equipment operators and owners.

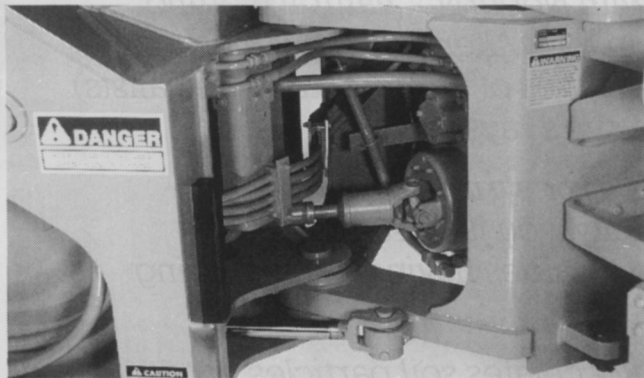
"Only a few minutes of operator attention at each shift will keep wheel loaders performing at peak efficiency," says Jerry L. King, wheel loader service manager at JI Case. "Coupled with performing the regularly-scheduled maintenance tasks like filter and oil changes, the efforts result in a greater return on equipment investment and productivity."

Here are the basics for a routine inspection, and some suggestions on scheduled maintenance:

Fluid and oil

Checking fluid and oil levels are the most important elements of a daily inspection.

The traditional method to check levels is with a dipstick, although there is a trend toward sight glasses, which make inspections easier and help avoid dust contamination.



Wheel loader joints need lubrication every 1,000 hours.

Regular engine oil change intervals are recommended at 250 hours. Burned oil often means the engine is operating at higher temperatures than it should. This calls for an immediate inspection by a certified mechanic.

Oil analysis programs like Systemgard from Case offer a more thorough critique. Periodic oil samples are sent to a lab where technicians analyze it to determine engine wear.

Hydraulic oil should be drained and replaced every 1,000 hours—sooner if the machine is operated in very dusty conditions. Simultaneously, the hydraulic oil filters should be replaced, and the suction screen should be cleaned.

When checking transmission fluid,

pay close attention to different level requirements for cold and warm fluid, as listed in the operator's manual.

Additionally, brake fluid should be checked before each shift.

A quick radiator examination will indicate if it has been damaged during the previous day's operation. In most models, coolant bottles are conveniently visible and can be checked in the daily walkaround.

Both primary and secondary fuel filters should be replaced every 500 hours—sooner when working in extremely dusty conditions.

Every 50 hours, the fuel sediment bowl should be checked and cleaned if necessary.

Some wheel loaders have a light in the operator compartment that indi-

cates air filter restriction. Filter elements do not need to be disturbed until the warning light comes on.

With dual-stage cleaners, the primary filter can be removed and checked for tears, perforations and excess dirt. If cleaning is necessary, use compressed air at

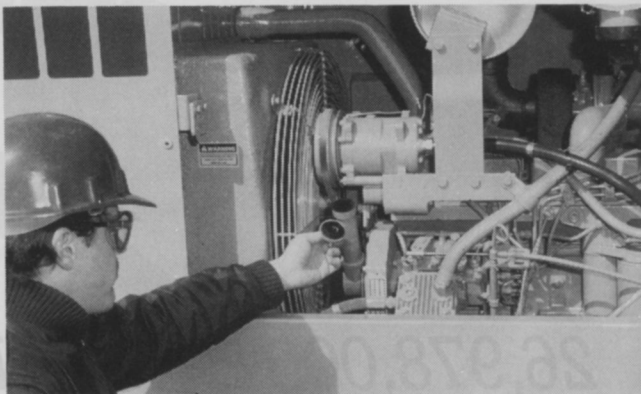
30 psi maximum and wash the element as directed in the operator's manual. The secondary filter should not be disturbed until replacement.

Always change both primary and secondary filters after one year maximum, or after the primary filter has been cleaned three times.

Most air systems have a tank to collect moisture that should be emptied at the end of each shift, minimizing the changes of moisture entering the entire system. Units equipped with air dryer systems require element replacement every 12 months.

Grease points

Some wheel loaders have drive lines with "lubed for life" universal joints



An oil analysis program could reveal engine problems.

that do not require regular greasing. If the drive line is not sealed, this grease point should be lubricated with the appropriate grease according to the maintenance schedule.

The center articulation and slip joints should also be checked and greased according to intervals specified in the operator's manual. While inspecting the center joint, check the hoses that route through to insure they are clean, properly spaced and not damaged.

Outside maintenance

Pivot points on loader arms also need regular greasing with a proper lubricant, such as molydisulfide. The operator should also look for any damage to the cylinders and hydraulic plumbing at this time.

Check the bucket's cutting edge for damage that might impair operation, and inspect teeth to insure wear limits have not been reached.

Because they are reliable and long lasting, tires are often neglected in routine inspections. However, they should be checked regularly for wear, punctures or cuts that can weaken tires and cause blowouts.

When new tires are installed or wheels are removed, check the torque on all lug nuts for tightness after 20 hours of operation. Monthly, or every 250 hours, give the tires and wheels a complete inspection.

With the unit running, check windshield wiper and its fluid level.

On engines with turbochargers, idle them for a few minutes before any shutdown. This extends equipment life by giving the turbocharger time to cool down.

"Although the number of elements to check may make a walkaround seem like a time-consuming task, it truly does become a routine that can be completed in just a few minutes," King says. **LM**

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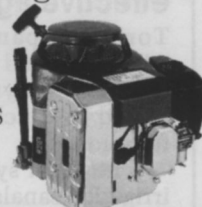
insulation sandwiched between) that muffles sound. And a dual-element air cleaner fitted with plastic ducts to bend and absorb intake noise.

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Circle No. 130 on Reader Inquiry Card



Products to control aquatic weeds

Control of aquatic weeds—those in ponds associated with golf courses and/or finely-manicured lawns and landscapes—can be obtained in numerous ways. Control products for the green industry include aquatic herbicides, aerifiers and harvesting machines. Here is a sampling of some:

Aquatic herbicide works on toughest weeds

Sonar aquatic herbicide from DowElanco selectively controls tough weeds such as hydrilla, milfoil and duckweed, and leaves desirable vegetation alone.

One application lasts one year or longer. The company says Sonar is ideal for ponds, lakes, reservoirs and canals.

During a typical treatment season, it takes 30 to 90 days for Sonar to work. Susceptible plants absorb Sonar through their leaves and shoots, and from the hydrosol by way of the roots. Within seven to 10 days, weeds bleach due to chlorosis. Sonar won't restrict swimming, fishing or drinking, even immediately after application, according to DowElanco.



Circle No. 301 on Reader Inquiry Card

Aeration system proves effective against algae

Toro Company announces the AIRE-O2 pond water aeration and circulation system which is designed to quickly attack algae infestation.

The quiet system is suitable for irrigation canals and ponds and goes to the source to eliminate algae buildup which can lead to odor, clogged filters and sprinkler heads

and piping problems.

The device injects and mixes atmospheric oxygen in a horizontal pattern into the water at a high speed.



Circle No. 302 on Reader Inquiry Card

Growth regulator controls by light

Aquashade aquatic plant growth regulator controls development of weeds through light control.

Aquashade is simple to use. It has been proven for 19 years to be effective, without harm to humans, fish, wildlife, cattle, or to turf and agriculture commodities.

Circle No. 303 on Reader Inquiry Card

Herbicide manages wide weed spectrum

Diquat successfully manages a wide variety of water weeds. A highly-



active, water-soluble contact herbicide, diquat provides superior

control over pennywort, salvinia, water hyacinth, water lettuce, bladderwort, coontail, elodea, naiad, pondweeds, duckweed, cattails and algae.

Due to its low toxicity to fish and other aquatic organisms, diquat has the added advantage of unrestricted fishing following application. Diquat also will not contribute to ground-water pollution, according to Valent USA.

Circle No. 303 on Reader Inquiry Card

Aerator comes with new, enhanced float

The RainJet Aquavator floating aerator comes with a new and enhanced float that provides: im-



proved stability, lower profile and overall size reduction.

The float now sits lower in the water for a more natural fountain effect. Fountain patterns are now also more consistent and function at maximum performance heights.

The Aquavator is designed for use on ponds or lakes at golf courses as a retention basin, or general waterscape on commercial sites. It helps condition water, preventing algae build-up, especially during the hot summer months.

Circle No. 305 on Reader Inquiry Card

3 days in July...

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New for '91 — seminars for commercial end-users on Saturday afternoon.

July 1991

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New aerification gear hits the market

From Turf-Tec International comes a new aerification attachment that the company says allows for deep aerifying on greens without disturbing the putting surface.

The Verti-Groove machine closes six-inch deep grooves on greens after soil has been removed. Turf-Tec says



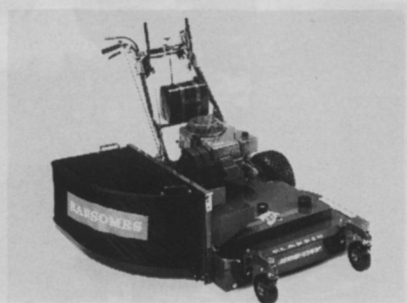
the aerifier has been fully tested and routine aerifying takes less time than standard methods now in use.

Circle No. 191 on Reader Inquiry Card

Economic midsize mower is steady workhorse

Ransomes announces its Bob-Cat Mid-Size Classic walk-behind is now available to commercial landscapers and LCOs who seek a low fuel consumption model at an affordable price.

The walk-behind features a 12.5 hp engine, 11- to 15-acre eight-hour mowing capability and a good selection of grass catcher options. Ransomes says the mower is of welded steel construction and is equipped with operator presence controls.

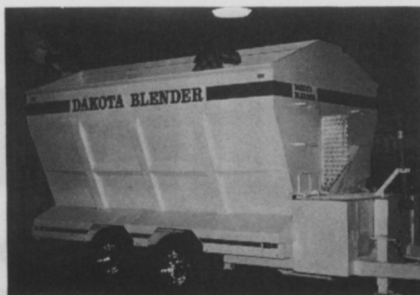


Circle No. 192 on Reader Inquiry Card

High performance blender is portable, affordable

Pioneer Peat and Dakota Blenders introduces the Model 2200 soil blender that the company says is specifically designed for golf course contractors.

The blender has a 200 tons per hour output, is priced about a third less than other competing models, and is easily towed by a pickup truck.



Equipped with a mechanical drive, the unit has a built-in stacking conveyor.

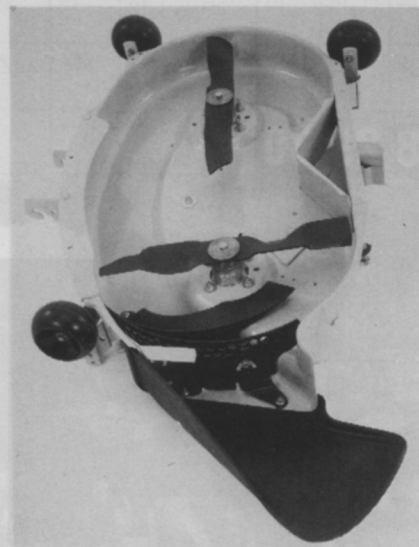
A special limited introductory price and testing kits are available.

Circle No. 193 on Reader Inquiry Card

Mulching attachment adjusts to conditions

From John Deere comes the Tricycler mulching attachment that the company says can perform recycling and mulching throughout the season.

The adjustable Tricycler is equipped with special mulching blades (in 30- and 36-inch decks) and variable adjustment heights for different con-



ditions. A deflector ramp also re-directs clippings for re-cutting.

Mulching leaves under dry conditions includes pulverizing the material into tiny bits which are then blown back into the lawn. Adjustments also allow for other settings to respond to lawn conditions.

Circle No. 194 on Reader Inquiry Card

New equipment cleaner cuts through grime

From Kalo, Inc. comes Tank Kleen, a cleaner versatile enough to remove dirt, grime, grease and pesticide and fertilizer residues.

Kalo says Tank Kleen also helps

neutralize acid-based pesticides which can lessen equipment corrosion and is effective against spray mixture contamination and plugged up pumps and nozzles. Quart and gal-



lon size containers are available.

Circle No. 200 on Reader Inquiry Card

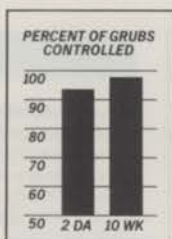
EXPO from page 12

of the expo's gross profits, up to \$400,000 or 54% over \$450,000. ALCA's share will be 25.3% for the lesser amount, sliding down to 24.0% for the higher amount. The only organization to receive a higher percentage as gross profits increase is the Professional Grounds Management Society (PGMS), which goes from 19.7% to 22.0%.

"The discussions have been spirited," said Andrews. "The turning point was when the organizations agreed to appoint three principles to discuss the agreement, instead of working through committees. We hit it off right away, and could talk about some of the issues that had to be talked about."

With the agreement's official signing, plans can now go forward with having the 1992 show at the Indianapolis (Ind.) Convention Center. Andrews said that the 1992 equipment demo area will be held in the infield at the Indianapolis 500 racetrack. □

When it comes to grubs, it's not enough just to suppress them.



Compiled from 18 university trials, 1985-86.

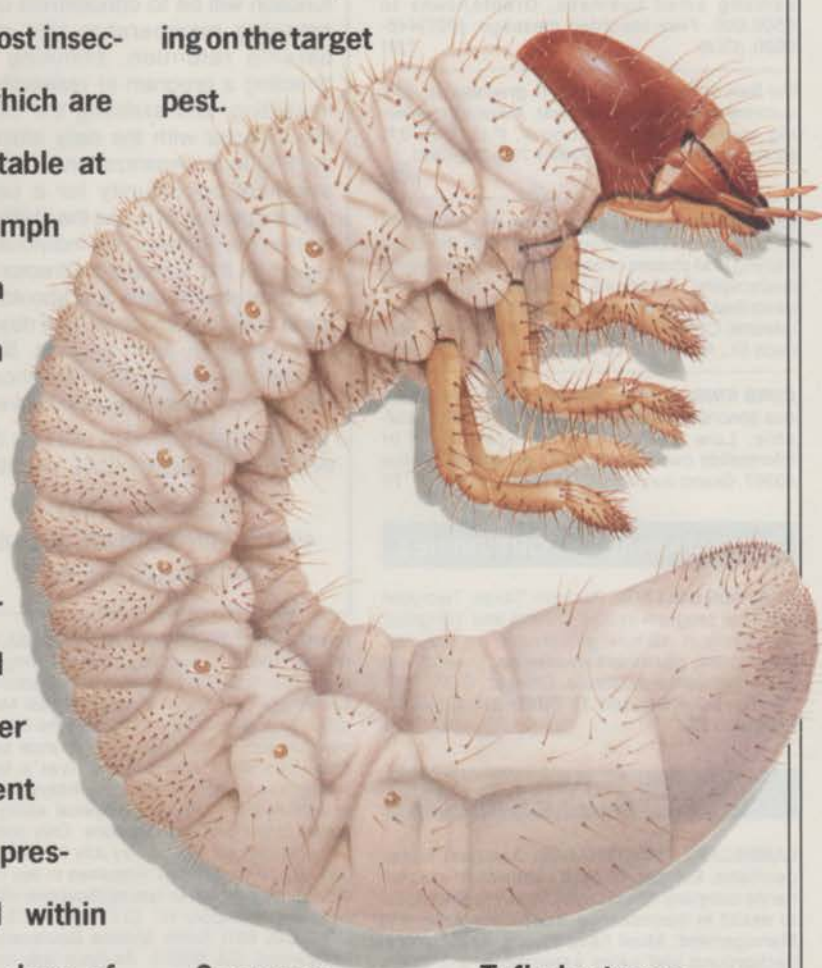
You want to squash them. Pulverize them. Grind them into dust. Send the little buggers to the root zone eternal. And who could blame you?

After all, this one creature has probably baffled more turf professionals, made a mockery of more chemical company claims, than all other turf

insects combined. Triumph® is changing all that. Unlike most insecticides, which are unpredictable at best, Triumph has been proven in over ten years of testing to consistently rid turf of over 90 percent of grubs present. And within just 2-3 days of application.

Better yet, once applied to the soil, Triumph keeps on working for up to 10 weeks, depending on the target pest.

grub damage. And protect you from losing what profits you have made to callbacks.



So one preventive application in late summer or early fall is all that's needed to protect turf from costly grub damage. To find out more, contact your turf products distributor or Ciba-Geigy representative.

**HOW TO
SQUASH A GRUB.**

TRIUMPH

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HELP WANTED DIRECTOR OF MARKETING

Professional Grounds Management Society is seeking an aggressive and highly motivated individual to manage our marketing program. The primary function will be to concentrate on increasing membership and membership retention, planning and directing a program of research and marketing, and assisting the Executive Director with the daily affairs of the P.G.M.S. Organization. This is an excellent opportunity for a career minded person who has the abilities to market the society. This individual will report to the Executive Director and the Executive Board and should reside in the Maryland area. Job description furnished upon request. Salary and benefits based on experience. Incentive bonuses for goal achieved.

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Sod, sprigs, row planting, strip sodding, solid sodding, fairway renovations, complete turn-key jobs. 16 yrs. golf course experience. 1-800-458-4756, DOUBLE SPRINGS GRASS FARM, Searcy, Arkansas. TF

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'86 ROTOMIST BLOWER for sale: 500 psi bean pump powered by a 4 cyl. Ford gas engine. 250 gal. tank. Contact Mike Young at Edmonds Landscaping, Halifax, Nova Scotia, Canada, 1-902-423-8174, Fax 1-902-455-9956. 6/91

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BUCKET TRUCKS, Straight Stick, Corner Mount and Knuckle Boom Cranes. Brush Chippers - New Asplundh (Morbark Disc Type), New Asplundh Drum Type. Best prices anywhere. Used Chippers - Asplundh, Woodchuck, etc. 2 to 8 usually in stock. Sprayers, Dumps, Stakes, Log Loaders, Crew Cab Chip Box Dumps, Railroad Trucks, 50 in stock. Sold as is or reconditioned. Opdyke's, Hatfield (Philadelphia Area) 215-721-4444. TF

BUCKET TRUCK: Hi Ranger 65', 57', 50'. Skyworkers with chip boxes. Asplundh bucket trucks with chip boxes. Asplundh brush chippers. Bean 55 gal. sprayers. Pete Mainka Enterprises, 633 Cecilia Drive, Pewaukee, WI 53072. 414-691-4306. TF

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PROBLEM MANAGEMENT

Ag chemicals and trees

Problem: Our hard and red maple resources are in decline. People blame acid rain, drought, exhaust fumes and other sources. How much effect does the use of agricultural chemicals have on the overall health of trees? Most of the trees in question are on fence lines where their crowns and root systems extend into the fields. Since the fine root hairs and feeder roots lay within 18 inches of the service, and the root systems extend well into the field, could herbicides, insecticides or other chemicals not be taken up by the tree and cause a change to its cell structure? (Ontario, Canada)

Solution: I am not familiar with the adverse effect, if any, of agricultural pesticides (herbicides, insecticides and fungicides) on nearby adjacent trees. Proper application of the above products according to label specifications should not present any problem. Based on my limited experience in working with corn, soybean, alfalfa and some fruit tree culture in clay soils, I haven't seen any phytotoxicity or adverse problems on non-target nearby fence line trees. The effect may be different in sandy soils because of the potential for leaching. Still, I do not anticipate a serious problem.

Examine the leaves, twig growth and root system. Most of these will show specific symptoms and patterns of injury. Based on this, tissue diagnosis can be done.

Herbicides will show specific leaf symptoms if they come in contact with agricultural crops or any other sensitive plants. Depending upon the products used, the leaves may show twisting, curling, cupping with veins pulled together; the leaves may be bleached or plants may show degrees of decline.

Acid rain, drought and exhaust fumes might be a partial or total cause. It is difficult to speculate without studying the problem on-site.

We have seen various degrees of drought symptoms different plants produced over the past two to three years. Drought, combined with rainy springs, have caused a less than ideal growing environment. Whatever happens to the root will adversely affect the crown. If the crown is injured it will produce less sugar for the future years; the absorbing root development and establishment will lessen, and decline follows.

Deicing salt used on roads may partially affect plant roots. Salts suppress water absorption. Many plants show various degrees of decline because of the exposure to extremes in moisture and/or temperature, deicing salt and other abiotic stress factors.

by producing bacteria in ooze on twigs during spring rains. Rain splash and insects spread the disease to blossoms. Bacteria produce blossom blight and then spread to the leaves, resulting in leaf blight. The bacteria then spread to twigs and produce cankers. In late spring, sudden wilt occurs. Blighted twigs show typical shepherd's crook (inverted "U" shape) symptoms. Leaves appear as if they are scorched by fire.

If conditions for the disease prevail, it could return. The plant and inoculum of the pathogen are present, waiting for favorable climate.

Prune when dry, and prune selectively, at least 10-12 inches into the clear wood; disinfect tools between cuts with Lysol, rubbing alcohol or Clorox (1:4). Do not overfertilize with soluble nitrogen fertilizer. Provide insect vector management as needed. Avoid destroying pollinating beneficial insects. Many extension publications recommend the use of Bordeaux mixture or streptomycin (Agri-strep). Make sure these products are labelled for use on specific plants. Hopkins Streptomycin C-17 has Rosacre on the label, and can be used on many rose family plants. Check with your local cooperative extension personnel for updated recommendations.

Bugs on pepper trees

Problem: What can be done to psyllid bug that has been affecting California pepper trees in the Southern California area? (California)

Solution: The pepper tree psyllid was first found in North America in Long Beach, California, in 1984. Since then it has been in many other areas of California. The California pepper tree is affected by the pest while its relative, the Brazilian pepper tree, is resistant. The adults are greenish and about 1/16-inch long. The nymphs are immobile and their feeding causes formation of pit galls. These insects usually occur on the lower leaf surface, but the upper leaf surface and small green twigs may be affected also.

The infected pepper tree usually appears grayish green and is sparsely foliated. Severe infestations cause major discoloration and distortion of affected plant parts, slowing of growth, and loss of foliage.

Acephate (Orthene) can be applied to control pepper tree psyllid. The insect appears to reproduce year-round along the coast so repeated spray applications about 60 days apart may be necessary. Read and follow label specifications for better results.

Fireblight to return?

Problem: Will we see fireblight in 1991? What is the best way to manage this problem? (Pennsylvania)

Solution: Fireblight affects rosaceous plants: pear, apple, cotoneaster, crabapple, quince, firethorn hawthorn and mountain ash. The bacterium overwinters on infected twig cankers and becomes active

494 06/03 28
29042 BU



Balakrishna Rao is Manager of Technical Resources for the Davey Tree Co., Kent, Ohio.

Questions should be mailed to Problem Management, LANDSCAPE MANAGEMENT, 7500 Old Oak Boulevard, Cleveland, OH 44130. Please allow 2-3 months for an answer to appear in the magazine.

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Always read and follow the label for Roundup herbicide. Roundup[®] is a registered trademark of Monsanto Company. © Monsanto Company 1991 RGP-1-170BR

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